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ROYAL BOTANIC GARDENS, KEW

L—AFRICAN ORCHIDS: XI.* V. S. SUMMERHAYES.

Habenaria rhopalostigma Rolfe in Dyer, Fl. Trop. Afr. **7**, 248 (1898). *H. nephrophylla* Schltr. in Engl. Bot. Jahrb. **51**, 507 (1915).

An examination of the type gatherings of these two species shows that they are almost identical. There are no basal leaves in the material of Rolfe's species but the upper parts agree in all essential features with *Stolz* 1836, the type of *H. nephrophylla*. In *Carson* 31 the anterior petal-segments, the lateral lobes of lip and the spur are a little longer than in *Stolz* 1836 but since these parts are all over 5 cm. in length a difference of 1 cm. or so is to be expected in different individuals or gatherings. The shapes of the parts and relative lengths are the same in both gatherings.

Habenaria Dregeana Lindl. in Ann. Nat. Hist. **4**, 314 (1840); Rolfe in Dyer, Fl. Cap. **5**, iii, 135 (1912).

H. Petri Schltr. in Ann. Transv. Mus. **10**, 245 (1924). *H. MacOwaniana* Kraenzl. in Engl. Bot. Jahrb. **16**, 150 (1893); Rolfe, l.c. 136; non *H. MacOwaniana* (Rchb. f.) N. E. Br.

In "Flora Capensis" Rolfe pointed out some of the differences between the above two species, which Kraenzlin had considered identical in his Monograph. Schlechter also in his key to the South African species of Sect. *Diphyllae* uses the petal differences in the two species (see reference above). *H. Petri* differs from *H. Dregeana* in the anterior petal-lobe being distinctly longer than the posterior instead of much shorter, in the side lobes of the lip almost equalling the middle lobe instead of being considerably shorter, and in the spur being more slender and not so markedly thickened at the base. The species are undoubtedly closely allied agreeing in general habit, inflorescence and column structure.

Unfortunately in his citation of specimens Rolfe again confused the issue as many specimens are cited under the wrong species. The following is a corrected list of determinations of the specimens cited by Rolfe in "Flora Capensis" so far as I have seen them, together with others added to the Kew collection since.

H. Dregeana. Cape Province: *Bauer* 815; *Miss Pegler* 348, 1814; *Hutton* 42. Natal: *Gerrard* 1811; *Penther* 275; *Rudatis* 258; *Wood* 815, 1058; *Mrs. Fannin* 81; Mount aux Sources, Dooley Slopes, 6000 ft., Feb. 1926, *Bayer & McClean*. Basutoland: *Lérivé*, 1911, *Dieterlen* 487a. Transvaal: Modderfontein, March

* Continued from K.B. 1938, 153.

1896, *Conrath* 1084; Johannesburg, Houghton Estate, Feb. 1923, *Moss* 7566.

H. Petri. Cape Province: *MacOwan* 767; Queenstown, summit of Long Hill, 4400 ft., March 1893, *Galpin* 1501; *Penther* 111 (partly). Natal: *Allison* 24; Aug. 1887, *Sanderson*, comm. *Wood*; *Sanderson* 487. Orange River Colony: *Sankey* 261. Transvaal: *Doidge* 4806.

It will be seen that *H. Petri* is commoner and more widespread than appears from "Flora Capensis." The sheet in the Stockholm Herbarium of *Penther* 111, collected at Newmarket in Griqualand East, consists of 2 specimens of *H. Petri* and 3 specimens of *H. Tysoni* Bolus. Schlechter (l.c.) separates this latter species from the two species already dealt with on account of the supposed completely glabrous anterior petal-lobe and labellum in *H. Tysoni*. The co-type material of *Tyson* 1068 at Kew has these organs distinctly if shortly ciliate and this is also the case in the *Penther* specimens. In any case this character seems to be of little taxonomic value in this group since in both *H. Dregeana* and *H. Petri* the petal-lobes (anterior and/or posterior) as well as the lip may vary from very faintly papillose and virtually glabrous to distinctly shortly pubescent.

H. Tysoni may, however, be distinguished by its much broader and looser spike, larger flowers, relatively narrower and more acute dorsal sepal, quite differently shaped spur and larger rostellum middle-lobe.

Habenaria epipactidea *Rchb. f.* in *Flora*, **50**, 100 (1867). *Orchis foliosa* Sw. in *Kongl. Vetensk. Acad. Handl. Stockh.* **21**, 206 (1800). *H. foliosa* (Sw.) *Rchb.f.* in *Flora*, **48**, 180 (1865), non A. Rich. *H. hircina* *Rchb.f.* in *Flora*, **50**, 100 (1867). *H. polyphylla* *Kraenzl.* in *Engl. Bot. Jahrb.* **16**, 214 (1892). *H. Schinzii* *Rolfe* in *Dyer, Fl. Trop. Afr.* **7**, 219 (1898). *H. perfoliata* *Kraenzl.* in *Bull. Herb. Boiss. sér. II.* **2**, 942 (1902). *H. Rautaneni* *Kraenzl. l.c.* **4**, 1008 (1904).

The above new synonymy is proposed as a result of an examination of type or authentic material of all the "species" mentioned. The oldest epithet for the species is *foliosa* proposed by Swartz in 1800, but owing to the existence of *Habenaria foliosa* A. Richard (1841) this epithet cannot be used. The species is characterised by the more or less orbicular-elliptical petals, the short and narrow lateral lobes of the lip, and especially by its remarkable column. Of this the large triangular conduplicate rostellum, rising well above and in front of the anther, is the most striking feature. A certain amount of variation occurs in the size of the flowers, in the shape of the petals, in the length of the lateral lobes of the lip and in the length of the spur, which in *Welwitsch* 736 (type collection of *H. hircina* *Rchb.f.*) is about twice as long as in any other specimen. There is, however, no apparent correlation between these variations, while the very characteristic column remains identical in all the specimens examined. The distribution

of the species is from Kilimanjaro in the north, southwards in Tanganyika Territory, Angola, South West Africa, Transvaal, Natal, Orange River Colony to the eastern Cape Province. It has not, however, yet been recorded from Nyasaland or Rhodesia.

Disperis raililabris *Summerhayes*, sp. nov.; ex affinitate *D. crassicaulis* Rchb.f., a qua folio multo minore, bracteis angustioribus, tepalis angustioribus acutioribusque, labelli lamina simpliciter exappendiculata differt.

Herba terrestris, erecta, gracilis, usque ad 15 cm. alta, purpureo-violacea; tuber anguste ovoideum, 5–15 cm. longum. *Caulis* basi vagina ovata acuta circiter 1 cm. longa instructus, infra medium unifolius, apice saepissime uniflorus sed usque ad 4-florus, glaber sed superne \pm rugulosus. *Folium* vaginiforme, ovatum vel lanceolato-ovatum, acutum, apice \pm reflexum, 4–10 mm. longum. *Flores* subdistantes, erecto-patentes; bractee late lanceolatae, convexae, acuminatae, 5–8 mm. longae, 2–4 mm. latae, ovario pedicellato manifeste breviores. *Sepalum* intermedium valde incurvato-falcatum, lanceolato-ligulatum, acutum, convexum, 10 mm. longum, 2 mm. latum; sepala lateralia e basi angusta oblique semi-orbicularia, acuta, latere antico medio leviter dilatata, praeterea margines anticos medios versus breviter et obtuse calcarata. *Petala* sepalo intermedio adnata, galeam semisphaericam apice trilobam formantia, apice libera, incurvato-falcata, 10 mm. longa, longitudinaliter plicata, lateribus reflexis, latere postico leviter incrassato (sepalo intermedio adnato) 0.5 mm. lato, latere antico erecto-patente margine undulato 2 mm. lato. *Labellum* basi columnae per 2 mm. adnatum, unguiculatum; unguis ligulatus, in toto 3.5 mm. longus, 0.7 mm. latus; lamina valde reflexa, simplex vel obscure triloba, quadrilateralis, quadrantibus tribus superioribus angustata, apice obtuse breviter acuminata, 3.5 mm. longa, 2.5 mm. lata, apice excepto glabro omnino papillosa. *Columna* 2 mm. alta. *Anthera* 2.2 mm. longa; staminodia curvata, papillosa, ante antheram posita. *Rostelli* lobus intermedius late orbicularis; brachia lateralia circinatim incurvata, apice divergentia, obtusissima, spathulato-dilatata. *Ovarium* 6–7 mm. longum, longitudinaliter rugulosum, glabrum.

OUBANGUI-CHARI. Near Sougaya, 40 km. S. of Yalinga, in moist sandy plain, May 31st 1921, *Le Testu* 2804 (type in Herb. Le Testu). "Plante tout entière non verte, mais d'un pourpre \pm violacé, atténué en jaunâtre au sommet."

This new species must be considered as belonging to the same group as *D. crassicaulis* Rendle, *D. Stolzii* Schltr., *D. katangensis* Summerh. and other similar species. It resembles most closely *D. crassicaulis* which agrees with it in possessing only one leaf which, however, is much larger than the small scale-like leaf of *D. raililabris*. In the latter species the lip, which, owing to its resemblance in shape to a flat-fish of the genus *Raia*, provides the specific name, is a very interesting structure. The lamina forms a kite-shaped quadrilateral with its broadest axis about a quarter of the

whole length above the base, and running out into a narrow blunt apex. The basal part is adnate to the claw in a similar manner as in *D. katangensis* but there is no apparent appendage. Presumably the flat apical "lamina" which is found in other species of this affinity is quite lacking. In *D. crassicaulis* this "lamina" is extremely small but bears a high vertical keel in its centre. It is possible that the lamina in *D. raiilabris* corresponds to the appendage in allied species since it is closely papillose all over except at the extreme apex, whereas in other species the appendage is the papillose part. (See Hooker's *Icones Plantarum*, tt. 3269–3271.)

Polystachya Bennettiana *Rchb.f.* *Otia Bot. Hamburg.* **2**, 113 (1881).

In Kraenzlin's monograph of the genus* the above species is placed as synonymous with *P. Steudneri* *Rchb.f.* which was published at the same time. Kraenzlin states that the original specimens of both species are very poor and that the descriptions are unsatisfactory. Examination of the type specimens in the Reichenbach Herbarium at Vienna shows that the two species are perfectly distinct, and, moreover, belong to two different sections of the genus! *P. Steudneri* seems naturally placed in sect. *Calluniflorae*, but *P. Bennettiana* is a close ally of *P. imbricata* Rolfe, *P. Rivae* Schweinf. and *P. stricta* Rolfe and should be placed in sect. *Caulescentes*, differing from most of its nearer relatives by the very slight blackening of the leaves on drying.

It is possible that Kraenzlin's mistake is connected with the mixture of the two species collected by Steudner under his number 702. I have seen three sheets of this number. That at Berlin, the Herbarium from which the material was distributed, contains seven specimens of *P. Steudneri* and two of *P. Bennettiana*. The sheet at Kew is evidently *P. Steudneri*, but that at Vienna contains two specimens of *P. Bennettiana* and none of *P. Steudneri*.

Polystachya stauroglossa *Kraenzl.* in *Engl. Pflanzenw. Ostafri. C.* **155** (1895). *P. graminoides* *Kraenzl.* in *Kew Bull.* **1926**, 289.

A comparison of the type specimens of these two "species" shows that they are identical. The species seems to be common in Uganda. The narrow leaves and spreading panicles of small, almost globular flowers give it a characteristic appearance.

Polystachya (§ *Elasticae*) eurychila *Summerhayes*, sp. nov.; a ceteris speciebus sectionis latitudine labelli longitudinem suam fere duplo superante, labelli pulvinis pilorum nullis facile distinguenda.

Herba epiphytica vel saxicola, sub anthesi aphylla. *Caules* approximati, erecti, usque ad 20 cm. alti, inferne modice incrassati, carnosi, foliorum vaginis ± membranaceis arcte imbricatis fere omnino obtectis, basi vaginis paucis acutis instructi. *Folia* non visa. *Inflorescentiae* terminales, simpliciter racemosae, erectae vel ± nutantes, usque ad 5 cm. longae, subdense pluri- vel multiflorae;

* Fedde, *Repert. Spec. Nov. Beih.* **39**, 35 (1926).

pedunculus vaginis 1-2 acutis imbricatis instructus; rhachis sparsiuscule setuloso-pubescens; bractee latissime deltoideo-ovatae, cuspidato-acuminatae, 1-2 mm. longae. *Flores* erecto-patentes, lilacino-rosei. *Sepalum* intermedium elliptico-oblongum, rotundatum vel minute emarginatum, 3.5-4 mm. longum, 1.7-2 mm. latum, trinervium; sepala lateralalia rotundato-triangularia, obtusa, interdum dorso sub apice breviter cuspidata, 4-5 mm. longa, basi 4-5 mm. lata, mentum conicum subacutum 3-3.5 mm. longum formantia. *Petala* ligulata vel spathulato-ligulata, circiter 3.5 mm. longa, 0.6-1.4 mm. lata. *Labellum* ex ungue brevi latissimum, trilobum, 3.5-4.5 mm. longum, 6-7 mm. latum; lobi laterales patentes, elliptico-oblongi, circiter 3 mm. longi, 2-2.5 mm. lati; lobus intermedius late triangularis, obtusus, 1-1.5 mm. longus, 1.5-2 mm. latus; labellum ecallosum, fere omnino farinaceo-puberulum. *Columna* circiter 2 mm. longa, fere teres; androclinii margo integer, hyalinus; anthera non visa; rostellum trilobum, lobis lateralibus tenuibus quadratis, intermedio porrecto carnosus; fovea stigmatica transverse elliptico-rectangularis; ovarium (cum pedicello brevi) 2-4 mm. longum. *Capsula* pyriformi-ellipsoidea, 6-8 mm. longa.

UGANDA. Mt. Elgon, between Butandiga and Bulambuli, 2400 m., arboreal, Jan. 1936, *Eggeling* 2438 (type); Butandiga, on rocky knoll, 2333 m., Jan. 1918, *Dummer* 3679. Chua, arboreal on *Acacia abyssinica*, Dec. 1935, *Eggeling* 2404.

A striking little species which agrees well with other members of sect. *Elasticae* in habit, the absence of leaves during flowering, the colour and texture of the flowers and the shape of the sepals. The lip, however, is completely devoid of the yellow hair-cushions characteristic of other species and is remarkable in being nearly twice as broad as long, the main part of the lip being formed by the large spreading lateral lobes. Both dorsal and lateral sepals are sometimes furnished with a very short dorsal cusp just below the apex, a feature which is much more prominently developed in other members of the section.

P. eurychila is interesting as being the first localised East African member of the section. *P. pseudo-Disa* Kraenzl. was described from a plant collected by M. T. Dawe, presumably in Uganda, but it has not been re-collected there. On the other hand a specimen has recently come to hand from Sierra Leone (coll. F. C. Deighton) where Dawe also collected. It is therefore still a little doubtful where Dawe's original specimen of *P. pseudo-Disa* really came from, although it is not by any means improbable that the species occurs in both Sierra Leone and Uganda. Such apparently discontinuous distributions are known in many African orchids and are probably only indications of our ignorance of the exact geographical distributions of African plants generally.

***Polystachya calluniflora* Kraenzl.** in Engl. Bot. Jahrb. **28**, 166 (1900). *P. trigonochila* Kraenzl. l.c. 167.

Examination of authentic or type specimens, and comparison of the descriptions, of these two "species" shows that they are conspecific. Indeed there are no essential differences in the descriptions although in his comments Kraenzlin relates his species to quite different species-groups. In his monograph of the genus (Fedde, Repert. Nov. Spec. Beih. **39**, 13, 37 : 1926) he even places them in distinct sections, *P. calluniflora* in sect. *Calluniflorae* and *P. trigonochila* in sect. *Caulescentes*, but for this latter choice there seems not the least justification.

Polystachya polychaete Kraenzl. in Engl. Bot. Jahrb. **17**, 50 (1893). *P. euspatha* Kraenzl. in Engl. Bot. Jahrb. **48**, 398 (1912).

I have examined the type specimens of the above two species as well as numerous specimens from the Gold Coast, Cameroons, Gabon, Uganda and Tanganyika Territory and can find no significant differences. The front lobe of the lip varies in breadth and in the shape of the apex, while the side lobes may be slightly recurved, strictly patent or slightly incurved with respect to the median line of the lip. In general habit, type of inflorescence, bracts and other floral parts there is remarkable uniformity, so that the species is easily distinguishable from all other species.

Polystachya Woosnami Rendle in Journ. Linn. Soc. Lond. Bot. **38**, 235 (1908). *P. longevaginata* Kraenzl. in Engl. Bot. Jahrb. **43**, 333 (1909).

Comparison of the two type specimens reveals their identity, but Rendle's name has a few months' priority over that of Kraenzlin. The vegetative and inflorescence characters are those of *P. Adansoniae* Rchb.f. and *P. Stuhlmannii* Kraenzl., but the flowers are larger with a much longer mentum while the lip is differently constructed, having a small orbicular middle lobe.

Polystachya Steudneri Rchb.f. Oti Bot. Hamburg. **2**, 113 (1881). *P. Beccarii* Rchb.f. ex Martelli, Florul. Bogos. 80 (1886). *P. Ellenbeckiana* Kraenzl. in Engl. Bot. Jahrb. **33**, 62 (1902).

Examination of the type specimens of the three above mentioned "species" shows them to belong to one species only. The structure of the inflorescence and flowers is characteristic and all three gatherings agree in these respects. The flowers in this species, however, open while the plant is in the leafless condition, the leaves developing later as the fruits ripen. The type of *P. Steudneri* represents a late stage with ripe fruits and fully-grown leaves, but in the other two specimens the leaves were only partially developed at the time of collection. In the Kew Herbarium are several gatherings of *P. Steudneri* from Mt. Elgon and Mt. Debasien to the north of it. These are all in the flowering stage but agree perfectly with the flowering material from Abyssinia. I have already referred to the confusion between this species and *P. Bennettiana* Rchb.f. under the latter species. The specimens of *P. Steudneri* at Berlin

and Kew under Steudner No. 702 exactly match the type specimen at Vienna (*Steudner* 704).

***Polystachya ramulosa* Lindl.** Bot. Reg. **24**, misc. p. 76 (1838), var. ***angustifolia* Summerhayes**, var. nov.; a typo foliis angustioribus anguste oblanceolatis, inflorescentiis pro rata brevioribus, floribus albis, labelli lobis lateralibus antice truncatis recedit.

GABON. Upper Ngounyé River, between the R. Wano and Ditadi, on the route from Kembélé to Mbigou, in the moss on a felled tree, Nov. 21st 1925, *Le Testu* 5775.

In spite of the differences enumerated above the Gabon plants (14 pieces in all) agree so well in general vegetative and floristic characters with the other material at Kew that I do not feel able to separate them except as a variety. The whole of the material was apparently collected from a single tree so it may quite possibly represent clones of one original plant.

It is still a question as to whether *P. ramulosa* is better placed in sect. *Calluniflorae* than in sect. *Eupolystachya*. The species has the small flowers and long mentum of many species of the former section but in habit and inflorescence it is very like a small *P. odorata* Lindl.

***Polystachya odorata* Lindl.** in Journ. Linn. Soc. Lond. Bot. **6**, 130 (1862). *P. usambarensis* Schltr. in Notizbl. Bot. Gart. Berl. **2**, 250 (1898).

Some years ago (Kew Bull. 1935, p. 198) I suggested that *Polystachya usambarensis* Schltr. was incorrectly placed by Kraenzlin in sect. *Elasticae*. An examination of the type specimen shows that this is actually the case and also that the plant was merely a small, poorly developed individual of the well-known *P. odorata* Lindl. This species has been found in Uganda but not elsewhere in East Africa. Whether Holst collected the original specimen of *P. usambarensis* in the wild state or whether it was a cultivated plant is not evident from the information available. It is possible that it was an introduction from West Africa.

***Polystachya tessellata* Lindl.** in Journ. Linn. Soc. Lond. Bot. **6**, 130 (1862). *P. gracilis* De Wildem. Notic. Pl. Utiles Congo, 136 (1903). *P. latifolia* De Wildem. l.c. 138.

On examination *P. gracilis* is seen to be merely a small and poorly grown specimen of *P. tessellata*. On the type sheet there are also a number of leaves belonging to plants of *P. mukandaensis* De Wildem. which was collected by Gentil at the same locality and on the same occasion. The specimens of *P. latifolia* in the Brussels herbarium are all typical *P. tessellata* and it is difficult to appreciate the grounds on which *P. latifolia* was distinguished from Lindley's species; the characters mentioned by De Wildeman seem quite inadequate. Kraenzlin's reduction of *P. latifolia* to *P. odorata* Lindl. is incorrect, as the two have quite different inflorescences.

Polystachya mukandaensis De Wildem. in Notic. Pl. Utiles Congo, 139 (1903). *P. Huyghei* De Wildem. l.c. 315, cum fig. (1904). *P. Plehniana* Schltr. in Engl. Bot. Jahrb. **38**, 8 (1905). *P. Dorotheae* Rendle in Cat. Talb. Niger. Pl. 103, t. 13, fig. 3, 4 (1913).

I have already, in the Flora of West Tropical Africa, **2**, 432 (1936), reduced *P. Plehniana* and *P. Dorotheae* to *P. mukandaensis*. On examining the description and authentic material of *P. Huyghei* De Wildem., I find that it also cannot be separated from *P. mukandaensis*. The species is readily recognised by the linear-elliptical or linear-lanceolate leaves, and the labellum, which is trilobed only in the apical quarter, the short and broad middle lobe being furnished with a short keel or crest which is separate from the main crest on the disk of the lip. It is, however, clearly a member of sect. *Eupolystachya* allied to *P. tessellata* Lindl. and other similar species. Kraenzlin (Fedde Repert. Nov. Spec. Beih. **39**, 52 : 1926) considered *P. mukandaensis* as identical with *P. hypocrita* Rchb.f., but an examination of the type specimen of the latter species shows it to be quite different from *P. mukandaensis* and indeed the same as *P. tessellata*.

Polystachya golungensis Rchb.f. in Flora, **48**, 185 (1864). *P. spiranthoides* Kraenzl. in Kew Bull. 1926, 294.

In a previous paper of this series (Kew Bull. 1935, 199) I published a note on this species and cited three synonyms. There is now a fourth, *P. spiranthoides* Kraenzl., to be included. This adds practically nothing to our knowledge of the species since the material described by Kraenzlin was cultivated, incomplete and of uncertain origin. Examination shows it to agree well with other authentic material of *P. golungensis*.

Polystachya (§ Eupolystachya) gabonensis Summerhayes, sp. nov.; affinis *P. dolichophyllae* Schltr., a qua foliis angustioribus, inflorescentiis folia usque ad duplo superantibus, floribus minoribus, sepalis lateralibus et labello pro rata latioribus, labello basi dense farinaceo-pilosulo ecalloso apice obtuso differt.

Herba terrestris, anthesi usque ad 55 cm. alta. *Caules* caespitosi, erecti, carnosi, teretes, usque ad 15 cm. alti, inferne fere 1 cm. diametro, sursum sensim angustati, basi vaginis paucis obtusis instructi, sursum usque ad apicem foliis 4–6 laxiuscule vestiti. *Folia* adscendentia, e vaginis ± recurvata, lineari-oblonga vel anguste oblongo-lanceolata, apice obtusa vel acuta fere aequaliter obtuse vel subacute brevissime bilobulata, inferne conduplicato-carinata; lamina (supra articulum) usque ad 17 cm. longa, 8–20 mm. lata, infima saepius multo breviora; vaginae sublaxae, usque ad 6 cm. longae. *Inflorescentiae* erectae, rigidae, usque ad 45 cm. altae, simplices vel prope apicem pauciramosae, multiflorae; pedunculus teres, usque ad 30 cm. longus, vaginis circiter 3 complanatis acuminatis fere omnino obtectus; rhachis usque ad 15 cm. longa, subdense setuloso-pubescent; rami 1–4, suberecti, usque ad 5 cm.

longi; bracteae triangulari-lanceolatae, acuminatae, 2-5 mm. longae; pedicelli cum ovariis 3-5 mm. longi, pubescentes. *Flores* flavi, erecto-patentes. *Sepalum* intermedium oblongo-ovatum, breviter acuminatum, 4.5-5 mm. longum, circiter 2.5 mm. latum, trinervium; sepala lateralía oblique ovato-triangularia, breviter acuminata, latere antico (vel superiore) 5.5-7 mm. longa, pedicolumnae adnata mentum obtusum circiter 3.5 mm. longum formantia; sepala omnia extra pubescentia. *Petala* oblonga, inferne leviter angustata, obtusa, 4 mm. longa, 1.25 mm. lata, uninervia. *Labellum* medio vel supra medium breviter trilobatum, rhomboideo-quadratum, 5-6 mm. longum, circiter 5 mm. latum; lobus intermedius late rotundato-triangularis, apice brevissime apiculatus, 2-2.5 mm. longus, 3-3.5 mm. latus; lobi laterales leviter incurvati, semi-orbiculares, rotundati, 0.6-0.7 mm. longi, 0.8-1.1 mm. lati; discus dense pulverulento-papillatus (vel farinoso-pilosulus). *Columna* erecta, fere teres, 2.7 mm. alta; androclinium leviter excavatum; anthera rotundata, dorso breviter producta. *Capsulae* fusiformi-ellipsoideae, obtuse 6-costatae, 1-1.5 cm. longae.

GABON. Between the Rivers Woleu and Ntem, grassy spots on the rock between Salem and Elelem, Jan. 1933, *Le Testu* 8971 (type in Herb. Kew., isotypes in Herb. Le Testu); Akoum Mdomgou, near Oyem, April 1933, *Le Testu* 9084.

A species with a very distinct and easily recognizable facies on account of the rather crowded relatively narrow somewhat recurved leaves and the tall slender only slightly branched inflorescences, which stand out well above the leaves. The nearest relative is apparently *P. dolichophylla* Schltr. which has broader leaves, and larger flowers in much shorter inflorescences. The lip in *P. gabonensis* is broader and more obtuse and lacks the basal callus of *P. dolichophylla*; instead the disk is densely covered with mealy hairs. The inflorescences are somewhat reminiscent of *P. rhodoptera* Rchb.f. but that species has a very different habit and lip-structure.

Polystachya Ottoniana Rchb.f. in Hamburg. Gartenzeit. **11**, 249 (1855). *P. glaberrima* Schltr. in Engl. Bot. Jahrb. **20**, Beibl. 1, 11 (1895).

An examination of the type specimen of *P. glaberrima* Schltr. reveals several important errors in the original description and the notes following it. Schlechter states that the whole plant is glabrous and comments particularly on the rhachis and lip in this connexion, but in the type specimen both these parts are distinctly hairy, the hairs on each organ being similar to those in many other species of *Polystachya*. The lip is described (and also figured in Schlechter's dissections on the sheet) as "rhomboideum" and entire, but actually the flower he dissected has a trilobed lip, the side lobes, however, overlapping the middle lobe and thus apparently overlooked by him. Indeed comparison with specimens of the common *P. Ottoniana* Rchb.f. from the eastern Cape Province, Natal, and the Transvaal

shows that *P. glaberrima* is simply a form of Reichenbach's species in which the usual apiculus of the lip is more drawn out than generally; in other respects the plants are identical.

Polystachya (§ Affines) isochiloides *Summerhayes*, sp. nov.; affinis *P. Goetzeanae* Kraenzl. et *P. Shega* Kraenzl., ab illa floribus minoribus, labelli lobis lateralibus majoribus intermedio acutiore marginibus undulatis, ab hac caulibus longioribus, sepalis glabris, labello latiore basi callo lineari instructo distinguitur.

Herba epiphytica; caules approximati e rhizomate brevi exorientes, erecti, inflorescentiis inclusis usque ad 38 cm. alti, teretes, 1–3 mm. diametro, basi vaginis 1–2 arctis cincti, superne 3–4-foliati. *Folia* fere erecta, linearia vel ligulato-linearia, apice breviter obtuse vel subacute bidentata, 6–17 cm. longa, 2–6 mm. lata, superiora inflorescentiam saepius aequantia vel superantia. *Inflorescentia* simplex vel pauciramosa, usque ad 17 cm. longa, pluriflora; pedunculus usque ad 12 cm. longus, vaginis membranaceo-papyraceis omnino obtectus; rami 1 vel 2, usque ad 1 cm. longi; rhachis dense pubescens; bracteae lanceolatae, acuminatissimae, membranaceae, 2–7 mm. rarius usque ad 1.5 cm. longae; pedicelli (cum ovariis) 5–7 mm. longi, sparsissime pubescentes. *Flores* adscendentes, cremei, fragrantés. *Sepalum* intermedium incurvatum, lanceolatum, acutum, convexum, 10 mm. longum, 2.5–3 mm. latum, quinquenervium; sepalae lateralia subfalcatis lanceolato-triangularia, acuta, margine antice basi dilatata, circiter 10 cm. longa, basi 4–5 mm. lata, mentum subconicum leviter incurvatum, 3.5–4.5 mm. longum formantia. *Petala* curvatim ligulato-oblancheolata, acuta vel leviter acuminata, 8–9 mm. longa, 1.7–2 mm. lata, trinervia. *Labellum* basi breviter unguiculatum, supra medium trilobatum, 8.5–9.5 mm. longum, 6–6.5 mm. latum, recurvatum; lobus intermedius ovato-lanceolatus vel late oblongo-lanceolatus, acutus vel acuminatus, marginibus crispato-undulatis, 4 mm. longus, 2.75 mm. latus, valde recurvatus; lobi laterales fere semi-orbiculares, rotundati, circiter 1 mm. longi, 2 mm. lati; lobi omnes pubescentes vel rarius capitatis (? glanduloso-) pubescentes; discus callo (vel carina) lineari laevi antice sensim dilatato apice ipso rotundato 3.5–4 mm. longo instructus. *Columna* leviter incurvata, 2 mm. longa, semi-teres; androclinium leviter excavatum; nec anthera neque pollinia visa; rostellum truncatum.

TANGANYIKA TERRITORY. Handeni District, Mgera, Nyogi Mts. near Kwediboma, c. 1333 m. alt., in forest margin facing great precipice, Sept. 1933, *Burt* 4870 (type). Mt. Armfield, Koboriani Range, c. 1677 m. alt., on *Acacia* in *Berlinia-Brachystegia* woodland, Sept. 1933, *Hornby* 541.

I am placing this species, together with *P. Shega* Kraenzl. and *P. Goetzeana* Kraenzl., provisionally in Kraenzlin's sect. *Affines*, with which they agree in floral structure, but in habit, leaves and inflorescence they differ to such an extent from typical members of sect. *Affines* as to suggest that they really should form a new section.

The slender stems, almost leafless at the base, recall sect. *Caulescentes* but in other respects there is little similarity with species in that section. The present species is strongly reminiscent of *Isochilus linearis* in general habit, hence the specific epithet.

Polystachya simplex Rendle in Journ. Bot. **33**, 199 (1895).
P. aristulifera Rendle in Journ. Linn. Soc. Lond. **37**, 219 (1905).
P. pachyrhiza Kraenzl. in Engl. Bot. Jahrb. **43**, 334 (1909).

In floral and general vegetative features these three agree extremely well. The species belongs to sect. *Superpositae*, the vegetative parts being very similar to those of *P. fusiformis* (Thou.) Lindl., but the flowers considerably larger. The type collection of *P. simplex*, both at the British Museum and at Kew, consists of the uppermost component only of a superposed sympodium, but the remains of the component immediately below is evident in each case. I have now seen specimens of the species from Ruwenzori, the West Nile Province of Uganda, Mt. Elgon, the Kericho district of Kenya Colony, and Kilimanjaro. It is evidently generally distributed on the mountains of East Africa.

Eulophia flavopurpurea (Rchb.f.) Rolfe in Dyer, Fl. Trop. Afr. **7**, 65 (1897). *Cyrtopera flavopurpurea* Rchb.f. in Otia Bot. Hamburg. **1**, 68 (1878). *Lissochilus Millsoni* Rolfe, l.c. 79 (1897). *L. Sereti* De Wildem. in Ann. Mus. Congo, sér. 5, **3**, 180, t. 35, fig. 11-14 (1910). *Eulophia Millsoni* (Rolfe) Summerhayes in Hutch. & J. M. Dalz. Fl. West Trop. Afr. **2**, 446 (1936) et in Kew Bull. 1936, 225.

Examination of the type specimen of Reichenbach's species (*Schweinfurth* 3546) shows without doubt that the above cited names are synonymous, the epithet *flavopurpurea* having 19 years priority. This very widely distributed species must therefore in the future bear the name accepted above. So far properly developed leaves have been collected only in the type gathering and many collectors state that there are no leaves at the time of flowering. Since the scape and leafy shoot are separate in *Schweinfurth* 3546 it is possible that they really belong to two different species. The undeveloped leaves attached to flowering shoots in other collections seem likely to be much narrower when full-grown.

Eulophia Schweinfurthii Kraenzl. in Engl. Bot. Jahrb. **17**, 54 (1893); Rolfe in Dyer, Fl. Trop. Afr. **7**, 65 (1897).

Kraenzlin seems unaccountably to have misunderstood the floral structure of this species since he describes the sepals as orbicular and much larger than the petals. Rolfe, who had not seen the species, adopts Kraenzlin's interpretation in the "Flora of Tropical Africa." Examination of the type specimen shows that it is the petals which are the larger and indeed the plant is a typical member of the group which includes **E. orthoplectron** Summerh., comb. nov. (*Lissochilus orthoplectrus* Rchb.f.), *E. involuta* Summerh. and *E. bella* N. E. Br. In this group the sepals are more or less oblong-ob lanceolate and much shorter than the orbicular, apiculate

petals, while the spur is relatively long and pointed. *E. Schweinfurthii* seems to differ from all the other species assigned to this group; but it is difficult to judge accurately the limits of species in this and other groups of yellow flowered *Eulophias* formerly included in *Lissochilus*.

Eulophia Wakefieldii (Rchb.f. & S. Moore) Summerhayes, comb. nov. *Lissochilus Wakefieldii* Rchb.f. & S. Moore in Journ. Bot. **16**, 136 (1878).

Since *Wakefieldii* is the earliest published epithet in this group of yellow-flowered *Eulophias* I have decided to make the above combination from *Lissochilus* although I have not yet worked out the status of all the forms concerned. So far as I can see *E. speciosa* (R. Br. ex Lindl.) Bolus, an allied South African species, differs in the lip shape and colour, in the bracts, and in the vegetative parts.

LI—GENETICS IN RELATION TO EVOLUTION AND SYSTEMATICS AT THE SEVENTH INTERNATIONAL GENETICAL CONGRESS, EDINBURGH, 1939.

W. B. TURRILL.

Although the strained and uncertain international situation, both before and during the Seventh International Genetical Congress at Edinburgh, added considerably to the difficulties of the officers and organizing committee and resulted in the curtailment of certain parts of the programme, much of value was obtained by members from the papers read, from the discussions, and from personal contacts. Of the nine sections into which the Congress was divided that of Genetics in Relation to Evolution and Systematics had perhaps the widest appeal since it covered a varied field. Some of the more important of the papers given before this section are briefly reviewed below.

In the Plenary Session of the Section five papers were read—two by zoologists and three by botanists. Th. Dobzhansky in a paper with the title "On the Genetic Structure of Natural Populations of *Drosophila*" pointed out that evolution in the main has not been observed directly but inferred from a great body of morphological data. According to genetic theory the pressure of the evolutionary factors such as mutation, selection, isolation, and migration is constant and unrelenting. A living species can hardly remain static for any length of time. Recent research has demonstrated the existence of a tremendous field of variation in the germ-plasm of sexually reproducing and cross-fertilizing species. This variation encompasses a wealth of mutant genes and of gene rearrangements (especially inversions). From the standpoint of a systematist or morphologist this concealed variation is potential rather than one actually available to the species, but it represents the store of evolutionary raw material from which evolutionary changes must spring if they are to occur at all. This hidden field of variation is only detectable by genetic and cytological means. The main part

of the paper was concerned with detailed investigations of the concealed genetic variation in the species *Drosophila pseudoobscura*. It was shown that this species is a dynamic system of local colonies which can pursue, within certain limits, independent evolutionary courses. The elementary evolutionary changes occur in colonies of small breeding sizes and only secondarily, through migration and selection of superior genotypes formed in such colonies, can the texture of the species as a whole become gradually altered. Evolutionary changes are clearly not identical in all species, and groups where asexual multiplication, self-fertilization, or polyploidy occur should not be confused with species of *Drosophila*. Other considerations also make it certain that evolutionary changes differ both in rate and in kind in very common and mobile species on the one hand and in rare and more sedentary ones on the other.

G. Tischler's paper, "Die Bedeutung chromosomaler Rassen-differenzen für Systematik und Pflanzengeographie," was a useful summary of the relationship between chromosomal differences (especially polyploidy) and geographical distribution in plants, with special reference to the flora of Schleswig-Holstein. At least 400 wild coenospecies of Angiosperms are known which contain races with chromosomal differences. Many species become capable of surviving in a climatically unfavourable environment, through polyploidy, but within these species many plants remain diploid. Occasionally, though rarely, we find species of which the polyploid races are widely spread in more favourable climates. Many polyploids have become world-wide weeds, while their corresponding diploids have only local significance. These and other generalizations were illustrated by reference to *Salicornia*, *Triticum*, *Honckenya*, *Festuca*, *Vicia*, *Empetrum*, *Tradescantia*, *Penstemon*, *Veronica*, *Phleum*, *Vaccinium*, *Jasione*, *Matricaria*, *Datura*, *Paris*, etc.

J. S. Huxley in a valuable general paper, "Systematics in relation to genetics," stated that the progress of taxonomy itself and its contacts with other branches of biology are converting it into the basis of the study of evolution in action. Cytogenetic analysis is shedding light on particular taxonomic problems; taxonomic advance is suggesting important questions for experimental analysis; a combination of all lines of approach is increasing both the scope and the precision of the general principles underlying taxonomy and making it possible to forecast the course of differentiation and evolution in different kinds of taxonomic groups. Not only cytogenetics but ecology and embryology must also co-operate with taxonomy. Numerous examples, mostly from the animal kingdom, illustrated the various generalizations. It is clear that a concerted attack on what may be called biotaxonomy or micro-evolution will yield valuable results. What are likely to prove fruitful lines of attack include: the accurate mapping of the distribution of species and subspecies; the study of range-changes, and consequent hybridization; the description and genetic analysis of clines; the

tabulation of the occurrence of sharply contrasted phases, their ecological analysis, and the study of the spread of mutant types; population studies to determine the extent and the geographical and temporal variation of gene-mutants and sectional rearrangements in nature; studies on the degree of divergence (speciation and subspeciation) in relation to ecological peculiarities (e.g. ease of dispersal, reproductive habits) and to type of genetic machinery (e.g., polyploidy, presence or absence of asexual modes of multiplication). It is essential that a better liaison be established between taxonomy and other branches of biology, that the staffs of the great museums and herbaria be increased, and facilities provided in connexion with them for experimental and analytical work.

W. B. Turrill read a paper on "Taxonomy and cytogenetics in plants." He showed that while it is desirable for several reasons that the taxonomist should be relatively conservative the data made available by recent researches in other branches of biology often have an important bearing on taxonomic problems. Cytogenetic data are particularly important since they offer the chance of developing a more dynamic system of classification, though they may upset a static one considerably. There is a wide field of research of mutual interest to the cytogeneticist and to the taxonomist and the object of the paper was to suggest general and detailed lines of co-operative research. The following sub-headings were used: classification of characters; degree of correlation of characters; constitution of taxonomic groups; the study of polymorphic groups; geographical and ecological problems; hybridization in nature and experiment; problems of apomixis; problems of phylogeny; and general suggestions. The distinction between phenotypes and genotypes is important to the taxonomist, who, however, has largely failed to realize the importance of, or, at least, to put into practice, simple cultural experiments. The question of "splitting" or "lumping" can be clarified by cytogenetic data. The sufficiency or otherwise of the usually accepted taxonomic grades and their definition, the "breakdown" in correlation of taxonomically important characters, the taxonomic treatment of polyploids and of highly polymorphic groups, the relation of coenospecies, ecospecies, ecotypes, geographical "races," clines, hybrids, segregates, and other derivatives from hybrids, and apomicts to the orthodox taxonomic scheme of hierarchical groups are a few of the problems of common interest to the taxonomist and the cytogeneticist which urgently need solution. The frequently uncritical, and therefore unsatisfactory, assumption of phylogenetic speculation as a basis for classification was discussed at some length, and some of the phylogenetic problems whose solution might be aided by directed cytogenetic research were mentioned. The need for careful determination of material used in cytogenetic studies and the desirability of more extended work on wild species with stocks of known origin were emphasized.

S. C. Harland considered "Genetical studies in the genus *Gossypium* and their relation to evolutionary and taxonomic problems." The genus *Gossypium* is particularly suitable for studies in comparative genetics. It occurs in both the Old and the New Worlds and within it the genetical consequences of isolation for several millions of years can be traced. The most important results from work on species crossing in *Gossypium* are : (1) Genetical and cytological data provide a means of accurately delimiting the boundaries of the genus and of assessing relationships within it. (2) Species may be regarded as systems of modifiers. (3) The behaviour of selected mutants when crossed with a given species will reveal its taxonomic position in relation to other species. (4) Intercrossing of species results in the disintegration of the co-ordinated modifier systems possessed by each ; the greater the disintegration the greater the taxonomic divergence. (5) Geographical isolation causes profound genic change. Many, and in some cases possibly most, loci exhibit new alleles, and homologous characters become genetically differently constructed. (6) Genes may become mutable when transferred to the genetical background of other species. (7) The number of alleles at a given locus differing only slightly in their reaction with the genetical background, e.g. in dominance potency, is probably large.

It is impossible, in a brief account of the activities of the section, to give adequate summaries of the papers read at the ordinary sectional meetings, but a few that seemed of special interest to botanists or to taxonomists may be mentioned. A. A. Boyden read a very significant paper on " Genetics and Animal Relationship." Its significance lies partly in the remarkable similarity of his conclusions to those reached by a few (perhaps unorthodox) botanical taxonomists in this country. Thus, he said that classifications are never really "based on phylogeny" much less on genealogy ; rather both classification and phylogeny are based on similarities and differences in the organisms compared. A truly "natural" classification can result from putting essentially like things together, and in expressing their likeness in terms of *animal relationship*. This is wiser than to abuse the concept of genetic relationship by insisting on applying it to animals of the most diverse kinds where proof of real genetic relationship can never be obtained. S. W. Mansinkai gave an account of the cytology of the genus *Allium* in which he has examined 17 species, 11 diploids, 4 tetraploids, and 2 hexaploids. Evolution in the genus is taking place along three lines : (1) change in the number of chromosomes, (2) change in their structure, and (3) change in the genotype. R. E. Cleland and R. R. Gates summarized recent work on the analysis of wild-populations of *Oenothera* (subgenus *Onagra*). A. Müntzing dealt with incompatibility and fertility in experimental and natural polyploids, with special reference to barley, rye, and *Galeopsis*. M. Skalińska considered the origin of polyploidy in *Aquilegia*. T. J. Jenkin

showed that *Lolium* and *Festuca* are cytogenetically very closely related and were probably derived from a common prototype. R. D. Williams summarized his researches on incompatibility alleles in *Trifolium pratense*. Cultivated plants of the red clover carry a very large number of alleles for self and cross-incompatibility and these constitute a single series acting as oppositional factors.

Reference should be made to the very fine series of exhibits shown in the various laboratories of the King's Buildings of the University of Edinburgh. These exhibits mainly, but not entirely, illustrated papers read at the meetings. The exhibit of maize was particularly striking.

Many meetings for discussion were held—some being announced in the official programme and some arranged privately. Two were particularly valuable to taxonomists. One of these was an evening discussion on population problems and the methods of studying wild populations of animals and plants and the light such studies can throw on problems of taxonomy and evolution. The other was at an informal visit to the Scottish Plant Breeding Station, Corstorphine, when problems of coenospecies, ecospecies, and ecotypes were discussed with Dr. Gregor and his colleagues.

It is understood that papers read at the plenary sessions and abstracts of those read at the sectional meetings (so far as they have been supplied by the authors) are to be published in the "Journal of Genetics" as a special volume of Proceedings.

LII—ADDITIONS TO THE FLORA OF BORNEO AND OTHER MALAY ISLANDS: XIII.*

THE THEACEAE AND SYMPLOCACEAE OF THE OXFORD UNIVERSITY EXPEDITION TO SARAWAK, 1932. H. K. AIRY-SHAW.

For explanation of abbreviations, see K.B. 1939, 275.

THEACEAE.

Adinandra dumosa Jack in Mal. Misc. 2, no. 7, 50 (1822); Ridl. FMP. 1, 194.

Dulit Ridge, moss-forest, c. 1230 m., 8 Sept., Richards 1620: "Shrub, c. 3 m. high. Petals white, calyx pinkish. Leaves thick and leathery."

Adinandra plagiobasis Airy-Shaw, sp. nov., foliis oblique cordatis cum *A. cordifolia* Ridley comparanda, sed ceteris notis valde diversa atque *A. villosae* Choisy et *A. coarctatae* Craib (num hae revera distinctae?) ramulis foliisque patule pubescentibus magis approximata, foliis cordatis suboblongis angustioribus brevius petiolatis recedens.

Arbor 27 m. alta. *Ramuli* graciles, minute rugulosi, castanei, patenter pubercentes (pilis 1-1.5 mm. longis) et insuper minute patenter puberuli, novellis fulvo-sericeis. *Folia* oblonga vel

* Continued from K.B. 1939, 290.

elliptico-oblonga vel sublanceolato-oblonga, 6–17 cm. longa, 2–3.8 cm. lata, basi valde inaequilateraliter cordata, latere apicem ramuli versus spectante interdum rotundata vel vix cordata, altero latere valde cordata saepe auriculata, margine subintegra (revera minutissime et inconspicue serrulata), apice breviter acuminata, acumine obtuso, tenuiter coriacea, siccitate brunnea vel interdum (ut in *Symplocaceis*) supra laete viridia, supra ab initio glaberrima, subtus primum longe sericea, mox sparse patule pubescentia, satis dense nigro-punctata; costa supra impressa, subtus prominens, ut ramuli pube duplici vestita; nervi primarii laterales graciles, circiter 14–18 sed cum secundariis multis vix gracilioribus alternantes ideoque difficile numerandi, late patuli, fere recti, marginem versus valde irregulariter reticulato-anastomosantes, subtus prominuli, supra valde obscuri vix perspicui; petioli 3–5 mm. longi, costa vix crassiores, pube duplici induti. *Pedicelli* graciles, 1.5–2 cm. longi, indumento ut in ramulis, bracteolis caducissimis 3–5 mm. infra apicem sitis. *Sepala* ovata, circiter 1 cm. longa, crasse coriacea, basi connata, exteriora extra parce patulo-pubescentia, interiora extra adpresse sericea, omnia intus glabra. *Petala* late obovata, fere 2 cm. longa, 8–11 mm. lata, rotundata, dorso marginibus latis exceptis adpresse sericea, intus glabra. *Stamina* circiter 45–50: filamenta 2–3 mm. longa, basi connata corollaeque breviter adnata, dorso longe sericea; antherae lanceolatae, 4–6 mm. longae, acuminatae, acutae, dorso sericeae. *Ovarium* calyci breviter adnatum, sericeum, vertice truncatum, 5-loculare, placentis in quoque loculo bifidus, ovulis ∞ ; stylus simplex, 8 mm. longus, triente inferiore sericeus, ceterum glaber; stigma minutum. *Fructus* ignotus.

Dulit Trail, primary rain-forest on side of steep ridge, c. 500 m., 10 Aug., *Richards* 1191: "Tree, 27 m. high. Circumf. 1.73 m. at 1.5 m. from ground. No buttresses. Bark about 6 mm. thick, reddish, smooth, with very numerous lenticels arranged in transverse rows. Wood pale yellow; heart-wood suffused with purple. Leaves gland-dotted. Large gall common. Petals white. Anthers orange."

In spite of the striking character of the cordate base of the leaves, found elsewhere in the genus apparently only in *A. cordifolia* Ridley, the affinity of the present species is probably rather with *A. villosa* Choisy and *A. coarctata* Craib, with which it agrees in indumentum and general leaf-outline.

Adinandra subsessilis *Airy-Shaw*, sp. nov., ex affinitate *A. acuminatae* Korth., a qua foliis oblongis (nec ellipticis) angustioribus, ramulis petiolis costis patenter (nec adpresse) pilosis, floribus brevissime pedicellatis, fructu longe piloso recedit.

Arbor parva, ramulis teretibus usque 4 mm. diametro junioribus dense fulvo-tomentellis et insuper patenter pilosis ut videtur tarde glabrescentibus, innovationibus (foliis supra exceptis) longe sericeis. *Folia* oblonga vel elliptico-oblonga, 5–11.5 cm. longa, 1.5–3.5 cm. lata, basi angustata usque subrotundata, apice caudato-acuminata, acumine circiter 1–1.5 cm. longo gracili acutissimo, margine sub-

integra, minutissime serrulato-denticulata, chartacea, supra glaberrima siccitate fusco-brunnescentia, subtus molliter longiuscule adpresso-pubescentia serius glabrescentia; costa supra leviter impressa, glabra, subtus prominens, tomentella et patenter pilosa; nervi primarii laterales 12-14, graciles, utrinque prominuli, late patuli vel subpatentes, circiter 2 mm. intra marginem anastomosantes, nervis lateralibus secundariis inter primarios frequentibus, omnibus cum venulis ultimis reticulum distinctum satis densum efformantibus; petioli 2 mm. longi, tomentelli et patenter pilosi. *Flores* axillares, solitarii; pedicelli brevissimi, 1 mm. longi, dense patule fulvo-pubescentes, bracteolis 2 ovatis 1 mm. longis dorso sericeis. *Sepala* deltoideo-ovata, jam alabastro patula vel patentia vel recurva, inaequalia, 2 extimis minoribus 3-5 mm. longis 2-3 mm. latis, 3 intimis majoribus 4-7 mm. longis 3-3.5 mm. latis, acuta, rigida, crassa, dorso longe sericea, intus glaberrima. *Petala* latissime obovata, 8-9 mm. longa, 7-8 mm. lata, apice rotundata minute cuspidata, basi rotundata vel subunguiculata, medio dorso sericea, ceterum glabra, albida. *Stamina* circiter 30, uniseriata, 4-6 mm. longa, basi breviter connata et petalis brevissime vel vix adnata, filamentis inferne nudis superne longe sericeis, antheris lanceolatis 2-3 mm. longis inferne (maxime dorso) sericeis ceterum glabris. *Ovarium* depresso-globosum, 2.5 mm. diametro, longe sericeum, biloculare, loculis 6-7-ovulatis, ovulis majusculis pendulis; stylus simplex, 5-6 mm. longus, glaber vel ima basi paucipilosus, stigmatibus minuto. *Capsula* (unica fracta tantum visa) subglobosa, circiter 8 mm. diametro, longe pilosa, bilocularis, loculis 1-spermis. *Semina* discoidea, 6-7 mm. diametro, 1-2 mm. crassa, castanea, nitidula.

Dulit Ridge, rain-forest on steep slope, 700-900 m., 19 Sept., Native Collector 1958: "Small tree. Petals whitish."

The interrelationships of the species of *Adinandra* are obscure, and a careful revision of the genus is much needed. The 1-seriate stamens, bilocular ovary, few ovules and 2-seeded fruit of *A. subsessilis* distinguish it very clearly from all other known species. It is less easy to indicate its closest affinity. It resembles *A. acuminata* and *A. rostrata* Merr. in foliage, *A. villosa* Choisy and *A. plagiobasis* Airy-Shaw in indumentum, *A. rostrata* and *A. Lamponga* Miq. (*A. macrantha* T. et B.) in the few seeds. The 1-seriate stamens indicate a passage from the more typical species of *Adinandra*, in which they are normally at least 2-seriate, towards the more specialised genera *Eurya*, *Patascoya*, *Visnea*, etc., in which they are always 1-seriate (cf. Airy-Shaw in Hook. Ic. Pl. 34, t. 3342 (p. 3): 1937).

***Ternstroemia (Erythrochiton) microcalyx* Airy-Shaw, sp. nov.**, *T. Robinsonii* Merr. et *T. penangianae* Choisy affinis; a priore, quacum foliorum forma et magnitudine optime convenit, pagina inferiore conspicue elevato-puncticulata differt; a posteriore calyce parvo praecipue distinguitur.

Arbor 24 m. alta, ramulis 4-8 mm. diametro, cortice cinereo irregulariter rugoso vel longitudinaliter striato lenticellis parvis numerosis inconspicuis notato. *Folia* late elliptico- vel oblongo-obovata, 12-21 cm. longa, 5-9 cm. lata, basi in petiolum cuneato-attenuata, apice subrotundata usque subacuta, brevissime obtuse subcuspidata, margine integro revoluta, glaberrima, subtus conspicue (supra leviter) elevato-puncticulata, modice coriacea, siccitate rubido- vel purpureo-brunnea; costa supra impressa, subtus elevata, satis robusta; nervi primarii laterales circiter 10-jugi, graciles, patuli, subrecti, prope marginem obscure anastomosantes, secundariis parallelis interjectis, subtus prominuli, supra vix prominuli; petioli 5-15 mm. longi. *Flores* (masculi tantum cogniti) 3-4, circiter 1 cm. infra folia hornotina dispositi. *Pedicelli* patuli usque subpatentes, recti, 3.5-4.5 cm. longi, inferne dorsiventraliter compressi, bicarinati, circiter 1.5 cm. infra florem lateraliter bibracteolati, supra bracteolas fere cylindrici, striati; bracteolae oblongae, patentes vel recurvae, 2 mm. longae, caducae vel persistentes. *Calyx* valde exigua, circiter 8 mm. diametro, sepalis suborbicularibus subaequalibus 3-4 mm. diametro sub anthesin reflexis. *Petala* late obovata, 1.2-1.4 cm. longa, 0.8-1.1 cm. lata, vix vel latissime unguiculata, brevissime connata, rotundata, intus inferne longitudinaliter laminato-striata, patentia, alba, crassiuscula, margine tenui. *Stamina* numerosissima, basi in annulum petalis adnatum breviter connata, 2-3 mm. longa, linearia, applanata, thecis lateralibus, connectivo apice cuneato-flabellato-expanso. *Pistillodium* nullum. *Fructus* ignotus.

Gunong Laiun, Sungei Balapau, Ulu Tinjar, rain-forest on crest of ridge, 900-1000 m., 2 Nov., *Richards* 2423: "Tree, 24 m. high. Corolla white."

This is admittedly very close to *T. Robinsonii*, of Amboina, of which, unfortunately, flowers are not yet known, and I have described it as distinct mainly on the basis of the geographical distribution. The difference in leaf-surface may not be a specific character, and it is conceivable that the calyx, even if equally small in the female flower, might enlarge to the size of *T. Robinsonii* (2-2.5 cm. diam.) in the fruiting stage.

***Ternstroemia aneura* Miq.** Fl. Ind. Bat. Suppl. 477 (1860).

Forest Reserve, Marudi, "heath" forest, under 300 m., *Richards* 2658: "Tree, c. 12 m. high. Corolla white."

Vernacular name: *medang lawang*.

***Ternstroemia* (*Euternstroemia*) sp.**, aff. *T. Lowii* Stapf in Trans. Linn. Soc. ser. 2, 4, 132 (1894).

Dulit Ridge, open moss-forest on exposed peak, c. 1400 m., 17 Sept., *Richards* 1897: "Shrub, c. 3 m. high. Fl. buds creamy white. Leaves very thick and leathery, glaucous beneath."

This may be only a form of *T. Lowii*. It is in any case too young to describe.

Ternstroemia citrina Ridley in KB. 1938, 173.

Ulu Koyan, sandy forest, c. 800–900 m., 18 Sept., *Native Collectors* 1924: "Epiphytic shrub (?). On tall tree. Flower buds greenish white. Leaves very thick."

Schima crenata Korth. in Temm. Verhand. Nat. Geschied. Nederl. Overz. Bezitt. Bot. 143 (1839–42).

Ulu Koyan, sandy forest on ridge, c. 850 m., 15 Sept., *Richards* 1837: "Tree, 29 m. high, 86 cm. diam. Petals creamy white, one of them concave and incurved. Anthers bright yellow. Flowers sweet scented. No buttresses. Timber (Class 1 c). Numerous other trees in flower in neighbourhood."

Schima Lobbii (*Hook. fil.*) *Pierre*, Fl. For. Cochinch. 2, sub t. 121 (1887), in obs.; *Airy-Shaw* in KB. 1936, 498.

Gordonia Lobbii Hook. f. in Trans. Linn. Soc. 23, 162 (1860); *Melch.* in Engl. Nat. Pflanzenf. ed. 2, 21, 137 (1925).

Schima bancana Miq. in Ann. Mus. Bot. Lugd.-Bat. 4, 113 (1868–9); *Melch.* l.c. 139.

S. (?) *Beccarii* Warb. in Fedde, Rep. 18, 329 (1922).

Summit of Gunong Santubong (1st Division), low scrub on exposed mountain top, burnt ground, c. 800 m., Dec., *Richards* 2717: "Shrub, c. 1 m. high. Corolla white. Leaves glaucous beneath."

Schima aff. **rigida** Miq. in Ann. Mus. Bot. Lugd.-Bat. 4, 113 (1868–9).

Dulit Ridge, shady moss-forest, c. 1250 m. (also seen in light moss-forest and "transition" forest, but said not to occur at low altitudes), 11 Sept., *Richards* 1698: "Corolla white. Leaves somewhat bluish green, glaucous beneath. Tree, c. 12 m. high. Bark with strongly marked medullary rays."

Schima sericea *Airy-Shaw* in Hook. Ic. Pl. 34, t. 3309 (1936), *q.v.*, et in KB. 1936, 498.

Synge 1614.

SYMPLOCACEAE.

Symplocos Henscheli (*Mor.*) *Benth. ex C. B. Clarke* in Hook. fil. FBI. 3, 588 (1882), emend. *Brand* in Engl. Pflanzenr. IV. 242 (*Symploc.*), 89 (1901).

Cordyloblaste Henscheli *Mor.* in Bot. Zeit. 6, 606 (1848).

Dulit Ridge, forest by waterfall, c. 1200 m., 10 Sept., *Richards* 1669: "Tree, c. 3 m. high. Perianth pure white. Fls. with strong sickly sweet scent."

Symplocos laetiviridis *Stapf* in Trans. Linn. Soc. Bot. ser. 2, 4, 205 (1894); *Brand*, *Symploc.* 53 (1901).

Ulu Koyan, sandy forest, 800–1000 m., 18 Sept., *Native Collectors* 1917: "Shrub, 2 m. Petals white. Calyx pale yellowish green, red at base."

The following is a description of the flowers, which were previously unknown:

Receptaculum (scil. ovarium inferum) oblongo-obconicum, 1-1.5 cm. longum, dense adpresse sericeum. *Calycis segmenta* 5 (2 vel 3 saepe fere usque ad apicem connata), deltoideo-ovata, 1.5-2.3 mm. longa, subacuta, extra sparsius sericea, intus glabra. *Petala* 5, basi brevissime connata, obovata, 4-5 mm. longa, 1.5-2 mm. lata, rotundata vel obtusa, extra parcissime sericea, intus glabra, alba. *Stamina* circiter 40: filamenta basi corollae brevissime adnata, filiformia, 2-5 mm. longa; antherae minimae, didymoglobosae, minutissime punctatae. *Stylus* 4-5 mm. longus, glaber, stigmate parvo capitato.

LIII—ADDITIONS TO THE FLORA OF BORNEO AND OTHER MALAY ISLANDS: XIV.

THE ILICACEAE AND MYRSINACEAE OF THE OXFORD UNIVERSITY
EXPEDITION TO SARAWAK, 1932. H. K. AIRY-SHAW.

ILICACEAE.

Ilex sclerophylloides Loes. Monogr. Aquifol. in Nov. Act. Abh. Akad. Naturf. **78**, 77 (1901), *forma*.

Ulu Koyan, white sand forest, c. 850 m., 15 Sept., *Richards* 1820: "Tree, about 80-90 ft. [24-27 m.] high. Petals greenish yellow."

Vernacular name: *medang lit.*

This collection might almost equally well be referred to *I. alternifolia* (Zoll. et Mor.) Loes. or to *I. pleiobrachiata* Loes., both being very close to *I. sclerophylloides*. From the first-named, the present specimens differ in the inflorescences arising from the axils of last year's leaves or from relatively short axillary young shoots, instead of from the bare lower portions of elongate shoots of the current year. From the second, they differ in the mostly smaller, more coriaceous and shining leaves, and less conspicuous venation. From typical *I. sclerophylloides*, to which they probably make the nearest approach, they differ in the somewhat narrower leaves and the dull greyish, not white, bark of the year-old branches.

It would probably be most satisfactory to treat all the above as varieties of one species, for which *I. alternifolia* provides the earliest specific epithet.

Ilex (*Byronia*) *Laurocerasus* Airy-Shaw, sp. nov., *I. hypoglaucæ* (Miq.) Loes. (*I. sclerophyllæ* Hook. f.) necnon *I. grandifoliae* Merr. affinis, ab illa foliis multo majoribus subtus omni vestigia glaucedinis carentibus ideoque subnitidis, ab hac foliis multo crassius coriaceis, nervis lateralibus paucioribus validioribus, rete venularum multo laxiore, ab utraque foliis subsessilibus differt.

Arbor, 2.5 m. alta. *Ramuli annotini* robusti, 4-6 mm. crassi, fere teretes, cortice atro-fusco. *Ramuli hornotini* graciles, saepe valde elongati, usque 30 cm. longi, 2-4 mm. crassi, valde striato-angulati et complanati, recti, glabri, superne tantum foliiferae. *Folia* magna, subsessilia, oblongo-elliptica vel levissime lanceolato-oblonga, 13-25 cm. (et verisimiliter ultra) longa, 5.5-9.3 cm. lata,

basi rotundata vel saepius leviter sed distincte cordata, apice (in plerisque manco) ut videtur breviter acuminato, margine integerrima saepe valde revoluta, crasse et rigide coriacea (iis *Pruni Laurocerasi* L. subsimilia), ab initio undique glaberrima, siccitate supra fusco-olivacea subtus brunnescentia; costa valida, supra canaliculato-impressa, subtus valde prominens usque 3 mm. crassa; nervi laterales 8-10-jugi, late patuli, interdum fere patentes, graciliusculi, fere recti vel leviter sursum procurvi, marginem versus regulariter arcuato-anastomosantes, supra plana vel vix manifeste insculpti, subtus prominuli sed teretes (nec angulato-arguti ut in *I. hypoglaucæ*) et conspicue pallidi, rete venularum valde laxo et aperto; petioli brevissimi vel vix ulli, crassissimi. *Cymæ* e ramulorum hornotinorum parte media et inferiore, vel foliis hornotinis suppressis ut videtur ex axillis foliorum annotinorum, ortae, sub lente minutissime papilloso-puberulae, pedunculis usque 3-5 cm. longis, ramulis primariis ternis usque 7 mm. longis plerumque semel furcatis. *Flores masculi* 4-5-meri, circiter 7 in apice ramulorum ultimorum pseudo-umbellatim dispositi, pedicellis 1-3 mm. longis. *Sepala* latissime ovata, vix 1 mm. longa, paullo ultra 1 mm. lata, convexa, obtusa vel subacuta, minute eroso-denticulata, basi incrassata. *Petala* oblongo-obovata, 3-3.5 mm. longa, 2 mm. lata, obtusa, basi brevissime et levissime connata, sub anthesin paullo supra basin valde reflexa, alba. *Filamenta* subulata, 2-2.5 mm. longa, crassiuscula, erecta, petalis basi brevissime adnata; antherae ovoideae, vix 1 mm. longae. *Pistillodium* ovoideum, 4-5-angulatum, parvum. *Flores feminei et fructus* non visi.

Ulu Koyan, sandy rain-forest, c. 800-900 m., 18 Sept., *Native Collectors* 1939: "Tree, 2.5 m. high. Petals white."

Vernacular name: *kunyatang bukit*.

Very distinct from all the known species of Subgenus *Byronia* in its practically sessile leaves. In size and shape they are similar to those of *I. grandifolia* Merr., but the texture and venation are more like those of *I. hypoglaucæ* (Miq.) Loes., to which it is probably most closely allied.

The identity of *I. sclerophylla* Hook.f. with *I. hypoglaucæ* was suspected by Loesener: vide Monogr. Aquifol. 86, Obs. 2, and cf. Ridley, FMP. 1, 440. There is a fairly good syntype specimen (Banca, 8 Aug. 1821, *Horsfield* s.n.: "*Rengas* s. *Ingas*") of the latter in Herb. Kew., and several additional sheets from Sarawak of what is evidently the same species (nr. Kuching, 3 Feb. 1893, *Haviland* 2244; Rejang, Sibü, July 1893, *Kalong* for *Haviland* 2872 [2 sheets]; nr. Kuching, 1 April 1893, *Haviland & Hose* 3744 K: "flowers white"), besides *Beccari* 3323, cited by Loesener as *I. sclerophylla*. I find it impossible to distinguish specifically the fragmentary type-specimen of the latter (Malacca, *Griffith* 5013) from the Banca and Borneo material.

***Ilex orestes* Ridley** in KB. 1931, 35.

var. ***dulitensis* Airy-Shaw**, var. nov. foliis tantum 2-3 cm. longis 1-2 cm. latis subtus conspicue pustulato-verruculosis, nervis supra haud vel vix insculptis fere invisibilibus.

Dulit Ridge, edge of exposed peak of mountain, open moss-forest, c. 1400 m., 13 Sept., *Richards* 1769 (typus, Herb. Kew.): "Shrub, c. 3 m. high. Corolla white. Leaves very thick and hard."

Dulit Ridge, open moss-forest on exposed peak, c. 1400 m., 17 Sept., *Richards* 1886: "Shrub, c. 3 m. high. Fls. white."

One branch of no. 1769 bears fruit. These are subglobose, 2.5–3 mm. long by 2–2.5 mm. in diameter. The colour is not noted by the collector, but appears to have been red rather than black.

The relation between this variety and the type is comparable with that between *I. malaccensis* Loes. (punctate) and *I. Stapfiana* Loes. (epunctate).

***Ilex triflora* Bl. Bijdr. 1150 (1826).**

var. ***viridis*** (Champ.) Loes. Aquifol. 345 (1901).

Ilex viridis Champ. in Hook. Journ. Bot. Kew Gard. Misc. 4, 329 (1852)

I. triflora var. *longifolia* Ridl. FMP. 1, 438 (1923).

Dulit Ridge, moss-forest, c. 1250 m., 19 Sept., *Native Collector* 1963: "Shrub, c. 2 m. high. Petals white."

A large-leaved form, the leaves measuring up to 9.5 cm. long. Ridley's variety *longifolia* from Perak is certainly referable to Loesener's var. *viridis*.

***Ilex cissoïdea* Loes. Aquifol. 430 (1901).**

Dulit, primary forest on crest of ridge, under 300 m., 5 Nov., *Richards* 2449: "Tree, c. 20–25 m. high. Fls. greenish white."

Vernacular name: *geredam pangi*.

***Ilex malaccensis* Loes. Aquifol. 432 (1901); Ridl. FMP. 1, 437.**

No number was attached to this specimen.

MYRSINACEAE.

***Maesa striata* Mez, Myrsin., in Engl. Pflanzenr. IV. 236, 42 (1902).**

var. ***subintegra*** (Merr.) Airy-Shaw, comb. nov.

M. subcaudata Merr. var. *subintegra* Merr. in UCPB. 15, 234 (1929).

Dulit, by stream in secondary forest, under 300 m., 2 Sept., *Richards* 1593: "Shrub, c. 1 m. high."

I am unable to separate *M. subcaudata* Merr. from *M. striata* Mez, described from Sumatra. The variety *subintegra* is also represented by the following specimens from DUTCH S.E. BORNEO: between M. Uja and Kundim baru, 6 July 1908, *H. Winkler* 2694; between S. Tarik and Kwaru, 21 July 1908, *H. Winkler* 3066.

***Maesa ramentacea* Wall. in Roxb. Fl. Ind. ed. Carey et Wall. 2, 230 (1824); Mez, Myrsin. 27 (1902); Ridl. FMP. 2, 227.**

Bacobotrys ramentacea Roxb. Hort. Beng. 16 (1814), *nomen*, et Fl. Ind. ed. Carey, 1, 558 (1832), *descr.*

Dulit Ridge, moss-forest on edge of cliff, c. 1300 m., 13 Sept., *Richards* 1774: "Tree, c. 8 m. high. Fls. greenish white."

The inflorescences are unusually abbreviated in these specimens.

Embelia Ribes *Burm. f.* Fl. Ind. 62, t. 23 (1768) ; Mez, Myrsin. 303 (1902) ; Ridl. FMP. 2, 232, in obs.

E. garciniaefolia (Wall. ex A. DC.) Miq. Pl. Jungh. 187 (1852) ; Ridl. FMP. l.c.

Dulit Trail, primary forest on spur of mountain, c. 800 m., 29 Aug., *Native Collector* 1523 : "Woody climber on tall tree. Fls. whitish."

I cannot agree with Ridley (l.c.) that the Ceylon *E. Ribes* is "totally different" from the Peninsula plant: many Peninsula specimens in Herb. Kew. are almost indistinguishable from Ceylon specimens.

Embelia myriantha Mez, Myrsin. 304 (1902).

Sungei Balapau, R. Tinjar, secondary forest on bank of small river, under 300 m., 15 Oct., *Richards* 2221 : "Liane climbing to about 30-40 m. on tall tree. Stem c. 5 cm. diam. Flowers white."

Also represented by the following collection: near Kuching, 17 Nov. 1891, *Haviland* 918 (d.x.b.d.).

Embelia coriacea Wall. ex A. DC. in Trans. Linn. Soc. 17, 135 (1834) ; Mez, Myrsin. 313 (1902) ; Ridl. FMP. 2, 233.

Ulu Koyan, c. 800 m., 25 June, *Native Collectors* 2058 : "Climber on tall tree. Fl. buds pale green."

Dulit, under 300 m., 19 Oct., *Native Collectors* 2281 : "Liane ; fls. whitish."

Ulu Koyan, Dulit, "heath" forest, edge of river, c. 800 m., 7 Nov., *Richards* 2493 : "Liane on tall tree, hanging down in long festoons. Entire inflorescence greenish white."

Dulit Ridge, open moss-forest, c. 1230 m., 8 Nov., *Richards* 2505 : "On tree c. 8 m. high. Large woody liane. Fls. greenish white. Leaves very thick and leathery."

Dulit, primary forest, under 300 m., 11 Nov., *Richards* 2545 : "Large woody climber on tall tree."

I agree with Ridley that *E. pergamacea* A. DC. is not distinct from *E. coriacea*.

Grenacheria montana *Airy-Shaw*, sp. nov., a *G. cinerascens* Mez atque *G. Beccariana* Mez, quibus maxime affinis, differt caulibus acutissime angulatis, foliis minoribus crassius coriaceis glaberrimis haud acuminatis, petalis manifestissime nigro-punctatis.

Frutex scandens, 3-4 m. longus ; caulis gracilis, parte superiore usque 5 mm. crassus, acutissime 5-7-angulatus, sulca conspicua e quoque ramulo sursum percurrente, cortice nigro vel fusco-rubro laevi glabro ; ramuli laterales abbreviati, 1-7 cm. longi, ima basi acute deflexi, velut deorsum crescentes, foliosi, primum minute puberuli, mox glabrescentes, racemo terminati. *Folia* obovata vel elliptico- vel oblongo-obovata vel fere elliptica, (1-) 2-5 (-6) cm. longa, 1-2.5 cm. lata, basi leviter angustata vel subrotundata, apice obtusa vel rotundata, rarius obtuse subcuspidata, margine integro revoluta, glaberrima, crasse rigide coriacea, siccitate supra grisea et

saepe nitida, subtus rubido-brunnea obscura ; costa supra insculpta, subtus prominens ; nervi laterales late patuli vel fere patentes, gracillimi, recti, in nervum intramarginalem 1 mm. a margine conjuncti, supra valde obscuri, subtus levissime prominuli ; petioli 2-4 mm. longi. *Racemi* ut supra dictum ramulos breves laterales terminantes, 2-10 cm. longi, minute ferrugineo-puberuli. *Pedicelli* patentes, 1-2 mm. longi, minutissime puberuli. *Flores* ♀ tantum cogniti. *Sepala* fere 1.5 mm. longa, brevissime connata, late deltoideo-ovata, medio dorso nigro-verruculosa, margine ciliato-fimbriata, glabra vel dorso parce minutissime puberula. *Corolla* 2 mm. longa, usque duas vel tres partes divisa ; segmenta ovata vel suboblata, apice obtusa saepe inflexa, dorso ubique nigro-punctata, glabra vel apicem versus parce minute papilloso-puberula, intus valde papilloso-puberula, margine papilloso-ciliata. *Stamina* circiter 1 mm. longa, infra media petala affixa, antheris parvis oblongis dorso massa nigra auctis. *Ovarium* subglobosum, 0.5 mm. longum, glabrum, in stylum 0.5 mm. longum glabrum attenuatum, stigmate parvo capitato. *Ovula* ut videtur 2, lateralia, opposita, in placenta sphaerica semi-immersa. *Fructus* ignotus.

Dulit Ridge, moss-forest on brink of precipice, c. 1230 m., *Richards* 1646 : "Slender straggling shrub, c. 3 m. long. Fls. greenish white with peculiar smell."

Dulit Ridge, open dwarf moss-forest on exposed peak, c. 1250 m., 20 Sept., *Richards* 1980 (typus, Herb. Kew.) : "Climber on small trees, c. 3-4 m. long. Corolla greenish white."

This species may be regarded as the high mountain representative of *G. Beccariana* and *G. cinerascens*, which are perhaps scarcely distinct from each other. *G. montana* is at once distinguishable by its relatively small, rigidly coriaceous leaves with very indistinct venation and no acumen.

The remarkable deflexion of the branches is not mentioned by Mez in his description of the genus, though observable in herbarium material of all his species (except the incompletely known *G. bracteosa* (Scheff.) Mez). The branches are not merely curved or bent downwards immediately after leaving the stem : they actually originate from the stem in a downward direction, and the continuation of the main stem is frequently in exactly the opposite direction to that taken by the branch, forming a kind of flexuous zigzag. In the absence of direct field observations, it may be surmised that the deflexed lateral branches are of considerable service to the plant in hooking itself on to the trees and shrubs over which it climbs.

Grenacheria seems to represent a fairly natural group, but to separate it from *Embelia* on the sole character of the connate petals is not natural, since the very closely allied *Embelia fulva* Mez is thereby excluded. The essential features of *Grenacheria* appear to be the sharply deflexed lateral branches, the elongate, usually strictly racemose inflorescence in which each branch terminates, and the usual connation of the petals, taken in conjunction. One may nevertheless agree with Mez that *Grenacheria* is a genus "absque dubio separandum ne limites ordinis generum omnino evanescant." *Embelia fulva* (allied to *G. Lampani* (Scheff.) Mez) is hereby transferred to *Grenacheria* :

Grenacheria fulva (Mez) *Airy-Shaw*, comb. nov.

Embelia fulva Mez, Myrsin. 312 (1902); Merr. in Str. Br. Roy. As. Soc., special no., 475 (1921).

E. Lampani Scheff. sec. King et Gamble in JASB. 74 (2), 111 (1906), quoad specim. borneëns., non Scheff.

Grenacheria Lampani (Scheff.) Mez sec. Merr. l.c. 474 (1921), non (Scheff.) Mez.

? *Embelia amentacea* C. B. Clarke sec. Ridley, FMP. 2, 235 (1923), quoad loc. "Borneo," non C. B. Clarke.

SARAWAK. Sine loc. exact., *Lobb*; *Beccari* 1705 (type). Near Kuching, 1891, *Garai* in *Haviland* 819 ("d.k.r.s."); *ibid.*, 17 Mar. 1893, *Haviland** 2280: "Corolla segments lightly imbricate. Anthers white." Sine loc. exact., *Native Collector* (through Sar. Mus. for Bur. Sci., Manila) 105, 677.

Ardisia brachythyrso Stapf in Trans. Linn. Soc. ser. 2, 4, 202 (1894); Mez, Myrsin. 140 (1902).

var. **stictantha** *Airy-Shaw*, var. nov. calycis segmentis duplo longioribus conspicue verruculoso-punctatis, petalis punctatis.

Dulit Ridge, open moss-forest on exposed peak, c. 1300 m., 20 Sept., *Richards* 1992: "Shrub, c. 1-2 m. high. Corolla white."

A somewhat puzzling plant. The longer calyx-segments (more than half as long as the petals), and the conspicuous black and red dotting of both calyx and corolla, give the impression of a distinct species, but the foliage and inflorescences seem practically identical. In *Haviland*'s *Kinabalu* plant (the type of the species) the leaves are flat, but in *Richards*'s plant they are nearly all folded longitudinally and most of them are distinctly elevate-pustulate just within the margin on the lower surface.

Mez (l.c.) has unaccountably referred *A. brachythyrso* to Subgen. *Pyrgus*, but its affinity, as pointed out by Stapf, l.c., is clearly with *A. laevigata* Bl. (and *A. Moonii* C. B. Cl.) in Subgen. *Akosmos*, from which it differs chiefly in the umbellate-paniculate inflorescence. The minutely lepidote under-surface of the leaves is characteristic of this group.

Ardisia Zollingeri A. DC. in DC. Prodr. 8, 670 (1844); Mez, Myrsin. 111 (1902).

Dulit, forest by torrent, under 300 m., 15 Nov., *Richards* 2598: "Shrub, c. 1.5 m. high. Corolla greenish pink."

Ardisia synneura Scheff. Comm. Myrs. Archip. Ind. 80 (1867); Mez, Myrsin. 112 (1902).

Tapeinosperma synneurum (Scheff.) Philipson in Journ. Bot. 77, 103 (1939).

Marudi, clearing in "heath" (white sand) forest, under 300 m., 25 July, *Richards* 1014: "Shrub, c. 5 ft. [1.5 m.] high."

Ulu Koyan, Dulit, "transition" forest, c. 1100 m., 7 Nov., *Richards* 2494: "Fls. pinkish white. Weak shrub, 1 m. high."

I must dissent from the recently expressed opinion of Philipson (l.c.) that this species, together with *A. crassa* C. B. Clarke (*A. fortis* Mez) and *A. lancifolia* Merr., should be transferred to the genus *Tapeinosperma*.

* Error "Haviland & Hose," King et Gamble, l.c.; Merr. l.c. 474.

This genus was established by J. D. Hooker (in Benth. et Hook. fil. Gen. Pl. 2, 647 : 1876) for two New Caledonian species, *T. Vieillardii* Hook. f. and *T. Lenormandii* Hook. f. The outstanding character of the genus, and the one which gives it its name, is the flattened seed (not fruit, as stated by Mez, l.c. 162), enclosed in the flattened, indurated, undulate- or spinose-edged endocarp and fleshy pericarp of the rather large fruit.

Mez, in his monograph of the family (l.c.), greatly enlarged the genus by the inclusion of 24 additional species, but, of these, none of which the fruits are known agrees in this respect with the two original species. Several other species have been since described by Mez, Guillaumin and others, but the only one which seems reasonably close to the type is *T. cephalophorum* Gillespie (in B. P. Bishop Mus. Bull. 74, 8, fig. 7 : 1930), from Fiji. This is a remarkable plant : the flowers are concealed by large bracts, and the endocarp (erroneously referred to by Gillespie, l.c. 9, and fig. 7b, as the seed) is an obconic, pentagonal structure, with the angles produced into sharply flanged lobes, a flange from each lobe being decurrent to the attenuate base of the endocarp. The seed is pentagonal and conforms only roughly to the general outline. This structure is evidently an elaboration of that found in *T. Lenormandii*. It is very different from anything yet observed, as far as I know, in any other genus of *Myrsinaceae*.

The rigid use by Mez, for major groups, of the number and arrangement of the ovules on the placenta, uncorrelated with other characters, has probably produced an, at least partially, artificial classification. Gillespie points out that in Mez's generic key *T. cephalophorum* (and the closely related *T. punctatum* Gillespie, but fruits unknown) would run down to *Discocalyx* on account of the ovules being only 5. He is no doubt right in saying that these plants "certainly do not belong" to *Discocalyx*, but it seems at least possible that with these exceptions the great majority of the species assigned to *Tapeinosperma* since its first description are more closely allied to *Discocalyx*. As Gillespie says, "a reconsideration of the characters of *Tapeinosperma* is desirable," and this probably applies to many of the genera of *Myrsinaceae*.

***Ardisia oxyphylla* Wall. ex A.DC.** in Trans. Linn. Soc. 17, 119 (1834) ; Mez, Myrsin. 131 (1902) ; Ridl. FMP. 2, 242.

var. ***racemosa* Airy-Shaw**, var. nov. floribus in racemos elongatos nec breviter subumbellatos dispositis.

Dulit, rain-forest, under 300 m., 31 July, *Richards* 1046 : "Shrub c. 1 m. Corolla flesh-coloured."

Scott-Keltie Falls, Dulit, forest near waterfall, c. 500 m., 31 Aug., *Native Collector* 1552 : "Shrub or small tree. Petals salmon-pink with minute orange spots near apex. Sepals similar, paler. Stamens pale yellow with dark red spots externally. Pedicels red."

Dulit Trail, rain-forest on steep slope, 700-900 m., 19 Sept., *Native Collector* 1965 (typus, Herb. Kew.) : "Shrub, 2-5 m. high. Petals of waxy appearance, pink. Leaves thin, convex between main lateral veins."

This variety also appears to be represented by a specimen from Goping, PERAK, F.M.S., *Kunstler* 6185, referred to the species, without comment, by King and Gamble in JASB. 74 (2), 139-140 (1906), no allusion being made in the description to an elongate raceme. The variety is proposed with some reserve, as it has not been possible to examine authentic material of the racemose-flowered

species referred to this group by Mez, viz. *A. pubicalyx* Miq., *A. pendula* Mez and *A. racemigera* Mez, to which it may eventually prove to be more closely allied.

***Ardisia obovatifolia* Merr.** in SMJ. 3, 544 (1928).

Dulit Ridge, on ground in transition forest, c. 1230 m., 9 Sept., *Richards* 1658: "Fl. buds pink. Leaves reddish beneath."

Dulit Ridge, forest by waterfall, on ground, c. 1200 m., 10 Sept., *Richards* 1683: "Fl. buds pink, fruit scarlet."

Waterfall, Dulit Ridge, rocks in shade near falls, c. 1100 m., 14 Sept., *Richards* 1800: "Calyx pale crimson, corolla white. Leaves dark green, with matte 'velvet' surface above, reddish purple below; c. 0.3 m. high."

var. ***icaroides* Airy-Shaw**, var. nov. foliis minoribus anguste elliptico-oblongatis 8–10 cm. longis 2–2.5 cm. latis longe attenuato-acuminatis undulato-serrulatis, inflorescentiae umbellulis tantum 3–4 subapicalibus.

Dulit, on ground in transition forest, c. 1200 m., 9 Sept., *Richards* 1655: "Fl. buds pink. Leaves reddish purple below, very deep green above."

At first sight rather strikingly distinct from the type, but actually differing only in the size and shape of the leaves and in the poorly developed inflorescence. The leaves recall those of the Burmese *A. Icara* Ham., but the nervation and texture are quite distinct. It is perhaps only a juvenile state.

***Labisia pumila* (Bl.) Mez**, Myrsin. 171 (1902).

Ardisia pumila Bl. Bijdr. 688 (1826).

Labisia pothoina Lindl. Bot. Reg. [31], t. 48 (1845); Ridl. FMP. 2, 237.

forma ***genuina* Mez**, l.c. 172.

Dulit Ridge, ground in moss-forest, c. 1200 m., 6 Sept., *Native Collector* 410: "Height 1' [0.3 m.]. Woody. Flowers white, pale pink outside; anthers mauve. Leaves dark green above, purple beneath."

Dulit Ridge, on ground in "transition" forest, c. 1200 m., 9 Sept., *Native Collector* 1656: "Corolla pinkish white."

Ulu Koyan, sandy forest, on ground, c. 850 m., 15 Sept., *Native Collector* 1847: "Corolla flesh-coloured, with minute orange-brown spots externally."

Dulit Ridge, shady moss-forest, c. 1300 m., 3 Oct., *Richards* 2112: "Fls. pale pink; leaves green beneath."

forma ***lanceolata* (Scheff.) Mez**, l.c.

Ardisia pumila β *lanceolata* Scheff. Comm. Myrsin. Archip. Ind. 93 (1867).

Labisia pothoina var. *lanceolata* (Scheff.) Ridl. l.c.

Dulit, on ground in shady rain-forest, under 300 m., 2 Aug., *Synge* 1081: "Herb, c. 0.5 m. high. Fls. dull pink."

Ulu Koyan, "heath" forest, c. 800 m., 3 Oct., *Richards* 2113 : "Fls. pale pink ; leaves reddish purple below."

forma *gladiata* *Airy-Shaw*, f. nov. foliis anguste elongate elliptico-lanceolatis 25–42 cm. longis 2–5.5 cm. latis basi in petiolum breviusculum 2–4 cm. longum anguste alatum decurrentibus superne in apicem acutum sensim angustatis.

SARAWAK. Baram, Aug. 1894, *Haviland & Hose* 3474 K.

Marudi, swampy ground in shade, in white sand forest, near sea level, 28 July, *Synge* 50 (typus, Herb. Kew.) : "Berries red. Leaves glabrous and supporting a small lichen."

No berries were received with *Synge*'s specimen, which is in flower. The epithet is one proposed by Ridley in manuscript for a new species based on the above *Haviland & Hose* number, but I do not consider the plant distinct enough for this.

It should be noted that the proper authority for the combination *Labisia pumila* is Mez, l.c. The latter cites Benth. et Hook. f. ex *Indice Kewensi*, but the name is there not validly published, being given as a synonym of *L. pothoina*, and the combination was not made by Bentham and Hooker in the place there referred to (*Gen. Pl.*).

Of the generic name *Labisia*, Mez writes in a footnote : "Nominis derivatio dubia," but Lindley, l.c., explains it as follows : "From λαβίς, a spoon, in allusion to the form of the divisions of the corolla, which resemble the bowls of small spoons." The word λαβίς, however, properly means a *handle* or *holder* (<λαμβάνω, to take hold).

LIV—CONTRIBUTIONS TO THE FLORA OF TROPICAL AMERICA : XLII*.

NOTES ON THE GENUS *BELOTIA* A. RICH. A. A. BULLOCK.

About eighteen years have elapsed since Dr. Sprague revised the Tiliaceous genus *Belotia*, and the additional material which has accumulated since 1921 has naturally led to some modification in specific concepts. A series of twenty-one sheets from the United States National Herbarium (denoted by the letters US in the enumeration below) has been available for examination, in addition to the further material now in the Kew Herbarium (K).

The known geographical range of the species concerned has, in general, been extended by study of the additional material. *Belotia Campbellii* Sprague, for instance, described from British Honduras, is now known from several localities in that colony, and also from Costa Rica, Nicaragua, the Republic of Honduras, Guatemala, and from the two southern Mexican states of Oaxaca and Tabasco. It should be looked for in Yucatan and Chiapas. The identification of a Guatemalan specimen (*Goll* 243) with *B. caribaea* Sprague extends the range of that species from St. Lucia

* Continued from K.B. 1939, 199.

to the mainland. The range of *B. grewiiifolia* A. Rich., the type of the genus, is also extended from Cuba to Guatemala. It will be noted in the enumeration that I have followed Sprague, and disagreed with Standley, in the identification of this species and of *B. mexicana* (DC.) K. Schum. The range of the latter is also considerably increased.

Belotia Campbellii *Sprague* in Kew Bull. 1921, 277; Standl. in Publ. Field Mus. Nat. Hist. Chicago, Bot. Ser. 12, 240 (1936).—*B. tabascana* *Sprague, l.c.* 278.

TABASCO. Lomas de San Sebastian, March 1889 (fl.), *Rovirosa* 416 (K; type of *B. tabascana*).

OAXACA. Bellville, Feb. 1910 (fl.), *Orcutt* 3437 (K, US).

GUATEMALA. Puerto Barrios, Dept. Izabal, Feb. 1905 (fl.), *Deam* 146 (K, ex herb. New York Bot. Gard.); Santa Teresa, Subin River, April, 1933 (fr.), *Lundell* 2773 (K).

BRITISH HONDURAS. Without locality or date (fl., fr.), *Peck* 340 (K). Seven Hills estate (fl.), *Campbell* 75 (K, type). Sibun River (fr.), *Campbell* 81 (K). Stann Creek, about 12 miles from Stann Creek Town, Jan. 1921 (fl.), *Hummel* (K). Manatee, Aug. 1921 (fr.), *Hummel* (K). Big Creek, Feb. 1929 (fl.), *Schipp* 8 (K), "large forest tree (50 ft. high, 12 ins. diameter), with small pink flowers, wood white and very light, used for floats on fishing nets." Stann Creek to Mullin's River road, Stann Creek district, Jan. 1937 (fl.), *Gentle* 1872 (K), "tree, diameter 22 cm., in high forest." Vaca, El Cayo district, Feb. 1938 (fl.), *Gentle* 2235 (K), "tree, diameter 6 ins."

REPUBLIC OF HONDURAS. Forest along Highland Creek, Puerto Sierra, Jan. 1903 (fl.), *Wilson* 251 (K, ex herb. New York Bot. Gard.); *ibid.*, Feb. 1903 (fr.), *Wilson* 297 A (K, ex herb. New York Bot. Gard.). Santa Cruz de Yoaja, Dept. Cortes, in open mountain forest, 600 m., Aug. 1933 (fl.), *Edwards* 650 (K).

NICARAGUA. *Englesing* 135 (K, ex Mus. Yale School of Forestry).

COSTA RICA. Vicinity of El General, Prov. San José, 1070 m., in forest clearings, June 1936 (fl.), *Skutch* 2658 (K), "tree 23 m., flowers lavender."

Vernacular names: Moho (*fide* Hummel); Mountain Moho (*fide* Gentle). Capulin savanero (*fide* Englesing).

After careful and prolonged examination of all the material cited above I have concluded that the type specimen of *B. tabascana* represents a form of *B. Campbellii*. The leafy nature of the inflorescences of *B. tabascana* is repeated in those of Englesing's specimen from Nicaragua. This character may be due to some growth or environmental factor. Dissection of a number of flowers shows that the petal-shape difference is not significant, and the much wider geographical range recorded above serves to link the specimens originally placed under *B. Campbellii* and *B. tabascana* respectively. Standley (*l.c.*) apparently shares the writer's view, for he gives the range of *B. Campbellii* as "southern Mexico to Honduras."

Belotia caribaea *Sprague, l.c.* 276—*B. grewiifolia* A. Rich. sec. Standl. in Contrib. U.S. Nat. Herb. **23**, 737 (1923), partim, non A. Rich. (1845).

GUATEMALA. Semacoch trail to Panzas, Alta Vera Paz, March 1905 (fl.), *Goll* 243 (US), "large tree, wood soft."

This species was based on a rather poor specimen collected in St. Lucia by *Anderson* (K) and an unlocalized specimen in *herb. Miller*. (in herb. Mus. Brit.).

I have little doubt that the specimen cited above is correctly placed here, though the geographical range is thereby extended to the mainland.

Belotia grandifolia *Sprague, l.c.* 275—*B. grewiifolia* A. Rich. sec. Standl., *l.c.*, partim, non A. Rich. (1845).

OAXACA. Cafetal Soledad, 800 m., Aug. 1917 (fl.), *Reko* 3376 (US).

VERA CRUZ. Zacuapan, Dec. 1917 (fr.), *Purpus* 8047 (US)

This species is unrepresented at Kew, save for a dissected flower from the type specimen, collected at Zacuapan (*Purpus* 1916 in herb. Mus. Brit.).

Belotia grewiifolia A. Rich. in La Sagra, Hist. Ile Cuba, Bot. **1**, 209 (1845); *Sprague, l.c.* 276.

GUATEMALA. Vicinity of Puerto Barrios, Dept. Izabal, at sea level, June 1922 (sterile), *Standley* 25042 (US). Near the Finca Sepacuite, Alta Vera Paz, April 1902 (sterile), *Cook and Griggs* 622 (US).

Although the specimens cited above are sterile, I have no doubt that they belong to this species, which was hitherto known only from Cuba. *Standley* (in Contrib. U.S. Nat. Herb. **23**, 737 : 1923) records it from Mexico and Guatemala, but as indicated elsewhere in these notes, these records actually referred to other species. *B. grewiifolia* is the type of the generic name.

Belotia insignis *Baill.* in *Adansonia*, **10**, 182 (1872); *Sprague, l.c.* 274.—*B. mexicana* (DC.) K. Schum. sec. Standl. in Contrib. U.S. Nat. Herb. **23**, 737 (1923) partim, non *Grewia mexicana* DC. (1824), nec *Belotia mexicana* (DC.) K. Schum. (1890).

TEPIC. Near Colonio, April 1897 (fl., fr.), *Nelson* 4155 (K, US), "shrubby tree 10–20 ft., flowers purple." Foothills between Acaponeta and Pedro Paulo, Aug. 1897 (fr.), *Rose* 1941 (US).

MICHOACAN. Foothills of Volcano of Jorullo, Dec. 1829 (fl.), *Schiede* 692 (US, ex herb. Mus. Bot. Berol.); *ibid.*, March 1903 (fl., fr.), *Nelson* 6950 (US).

MICHOACAN OR GUERRERO. Botella, 400 m. granitic soil, Nov. 1898 (fl.), *Langlassé* 655 (K, US), "Arbre de 5 à 6 m., fleurs mauves." La Calera, 500 m., granitic soil, Dec. 1898 (fl.), *Langlassé* 717 (K, US), "Arbre, fleurs mauves."

OAXACA. El Calvario, 800 m., April 1917 (fl.), *Conzatti, Reko and Makrinius* 3076 (US). Cafetal Alianza, Distr. Pochutla, 500 m.,

April 1917 (fl., fr.), *Conzatti, Reko and Makrinius* 3126 (US). Cercanías de Tepenixtlahuaca, Distr. Tuquila, 850 m., Dec. 1921 (fl., fr.), *Conzatti* 4371. Vicinity of Cafetal Concordia, 400–650 m., April 1933 (sterile), *Morton and Makrinius* 2458 (K, ex US).

Without locality. *Liebmann* 467 (US, ex herb. Mus. Bot. Haun.).

Vernacular name: Yaco de Cal (*vide* *Conzatti*).

Most of the specimens cited above have been labelled by Standley "*Belotia mexicana*," whereas the correct interpretations of both *B. insignis* and *B. mexicana* were given by Sprague (*l.c.*), although the latter, at the time of the revision of the genus, saw only one specimen (*Palmer* 146, from Acapulco, Guerrero) of *B. insignis*. Burret (in *Notizbl. Bot. Gart. Berlin*, **9**, 856: 1926) also confused *B. insignis* with *B. mexicana* and at the same time regarded *B. Galeottii* Turcz. (which is conspecific with *B. mexicana*) as a distinct species.

***Belotia mexicana* (DC.) K. Schum.** in *Engl. et Prantl, Nat. Pflanzenfam.* **3**, vi. 28 (1890), excl. syn.; Sprague, *l.c.* 275—*B. grewiifolia* A. Rich. sec. Standl. in *Contrib. U.S. Nat. Herb.* **23**, 737 (1923), partim, non A. Rich. (1845).

CHIAPAS. Escuintla, Nov.–Dec. 1937 (fl., fr.), *Matuda* 2136 (K).

GUATEMALA. Vicinity of San Francisco de Miramar, Costa Cuca, 1000 m., April 1905 (fr.), *Pittier* 74 (US).

These specimens considerably increase the known geographical range of *B. mexicana*. It is now definitely known from Vera Cruz, Chiapas, and Guatemala. Standley (*l.c.*) recorded his "*B. grewiifolia*" from Guatemala and from Oaxaca, the former record being based on Pittier's specimen cited above, and the Oaxaca record on a specimen collected by Reko (No. 3376) which I have referred to *B. grandifolia*.

***Belotia panamensis* Pittier** in *Fedde, Repert. Sp. Nov.* **13**, 313 (1914); Sprague, *l.c.* 276; Standl. in *Contrib. U.S. Nat. Herb.* **27**, 251 (1928)—*B. macrantha* Sprague, *l.c.* 274.

PANAMA. Canal Zone: on slopes of wooded hills at Paraiso railway station, Dec. 1861 (fl.), *Sutton Hayes* 438 (K, type of *B. macrantha*), "pretty tree 20–30 ft., calyx reddish, petals pale blue"; along an old trail above the Reservoir, 1–3 miles from Gorgona, 40–150 m., Feb. 1911 (fr.), *Maxon* 4736 (US), "spreading tree, about 10 m. high"; "Cana and vicinity," 600–1950 m., April–June, 1908 (fr.), *Williams* 772, "[tree] 6 in. [diameter] by 40 ft. [high]"; near Panama, Dec. 1905 (fr.), *Sargent* 21 (US), "small tree"; Las Cascades Plantation, near Summit, Dec. 1923 (fl.), *Standley* 25795 (US), "wet thickets tree 20 ft., sepals pink, petals violet, showy, scarce."

The original account by Pittier of his *Belotia panamensis* was seriously misleading, the inflorescences being explicitly stated to be 1–3-flowered, both in the description and in the note embodying the diagnostic characters.

Comparison of material of two specimens cited by Pittier, *Maxon* 4736 and *Williams* 772, both in fruit, *Standley* 25795 (flower) and *Sargent* 21 (fruit) with *Sutton Hayes* 438, the type of *B. macrantha*, leads to the conclusion that all these are conspecific.

LV—MISCELLANEOUS NOTES.

ROBERT SCOTT TROUP.—It is with great regret that we record the death of Professor R. S. Troup, C.M.G., C.I.E., F.R.S., F.C.H., F.L.S., on October 1st at Oxford, at the age of 64. Troup was educated in Aberdeen at the Gymnasium, the Grammar School and the University, and in 1894 passed into Coopers' Hill College as a probationer for the Indian Forest Service. There he very soon showed his capability, passed out top of his year and was awarded the Fellowship of the College. The Professor of Forestry, Dr. (later Sir William) Schlich was so impressed with Troup's ability that he marked him out, while he was still at college, as his eventual successor.

Troup joined the Forest Department in Burma in 1897 and soon made his mark as a scientific forester of distinction, so that his selection in 1905 as Forest Economist at the newly instituted Forest Research Institute at Dehra Dun caused no surprise. In 1915 he became Assistant Inspector General of Forests and in 1917 was made Controller of Timber Supplies until the end of the Great War. In every post he filled he showed outstanding ability, both in practice and in the written word.

In 1919, Sir William Schlich, then about to retire from the Chair of Forestry at Oxford, induced Troup to return to England to stand as a candidate for that post. This he did with some hesitation as he was reluctant to leave the Indian field. Once he had submitted his name there was no doubt of his selection and he duly succeeded to the chair at the beginning of 1920, a position he held till his death. During this period he made several tours to various parts of the Empire and to some foreign countries to attend conferences and also in an official advisory capacity. In this way he extended both his knowledge and his influence. In virtue of his professorship he was elected a Fellow of St. John's College, Oxford, and became a D.Sc. of that University. In 1926 he was elected to the Fellowship of the Royal Society.

Troup wrote extensively and clearly on forest subjects, his first big work being his "Indian Forest Utilisation," but he will best be remembered by that fine work "The Silviculture of Indian Trees," published in 1921, an exhaustive and copiously illustrated treatise which contained all the knowledge available at the time about the species included, much of which was the fruit of his own research and observation.

Troup was very modest in spite of his achievements and this, with his sense of humour, kindness and charm of manner, will cause him to be remembered with affection by his numerous friends

and many generations of forestry students. He was imbued with a real sense of scientific caution and would not commit himself to any statement without verifying the facts and feeling very sure of his conclusions.

C. E. C. FISCHER.

LADY JOAN LEGGE.—We deeply regret to record the death of Lady Joan Legge in the Bhyundar Valley on 4th July, during a climbing and collecting expedition in the western Himalayas. Lady Joan, who was the youngest daughter of the sixth Earl of Dartmouth, was especially interested in horticulture and farming, including pedigree dairy cattle. She was a J.P. for Staffordshire and amongst other activities of her strenuous life she took a leading part in the Boy Scout Group of that county and was for a time County Commissioner. She was a great lover of plants and when the opportunity arose to visit the Valley of Flowers which had been so vividly described by Mr. F. S. Smythe she eagerly seized it. She spent several months at Ranikhet and Joshimath in Kumaon, securing seeds and roots for her friends and dried specimens for the Kew Herbarium. Although not an experienced collector her dried specimens were gathered with great care and were accompanied by useful notes indicating her interest and enthusiasm in her favourite subject. Death was due to an accident caused by the treacherous nature of the ground after heavy rains and drifting snows.

Annual Report of the Superintendent, Botanical and Forestry Department, Hong Kong : 1938.—In his annual report on the Botanical and Forestry Department of Hong Kong, the Superintendent reports that the Government has shown increased interest in matters connected with Forestry and Agriculture. The importance of protecting and extending the area under forest is recognized, not only from the point of view of the increased demand for fuel owing to the greatly enlarged population which has resulted from the Sino-Japanese conflict, but also with a view to checking erosion. It is proposed to increase the area under forest reserve, and to check illegal fellings and the damage caused by goats. The tree mainly used for afforestation is *Pinus Massoniana* Lamb., and trials were made with different methods of planting. The method of sowing *in situ* which necessitates the digging of pits was compared with broadcasting the seed. Both methods are necessary in dealing with the different types of area in the Colony, but the broadcasting system has given good results with the pines in the burnt areas. Other trees that are being planted in the new forest reserves are *Pinus kasya* Royle ex Parlat., *Liquidambar formosana* Hance, and *Aleurites montana* E. H. Wils.

An attempt is being made to establish one or two species of economic "bamboos." The planting material was obtained from Canton. These efforts were not altogether successful as some of the

planting material was too young, and the method of packing for transport was unsuitable. This has somewhat retarded the development of a useful scheme, which will now be organised on sounder lines in view of the experience gained.

Microscopy of Drugs.*—This work provides an introductory course in the microscopy of drugs suitable for students preparing for the B. Pharm. and other examinations in pharmacy, or for the Fellowship of the Institute of Chemistry. General principles and technique are dealt with briefly in the chapters on drawing, micro-measurement, and microchemical tests, but the major portion of the book is devoted to the more important drugs. These are grouped on their morphology into chapters, each of which opens with a short account of the different types of structure to be encountered. A schedule for the examination of the whole drug and the powder is provided for each drug, with a summary of the diagnostic microscopical characters illustrated by a page of original line drawings. Together, the drawings make an atlas of drug microscopy which should prove useful for reference as well as for teaching; details are drawn to a uniform magnification of 200 diameters, thus facilitating comparison. The morphological grouping of the drugs results in chapters of unequal size, six rhizomes or roots, six fruits, or seeds, but only one herb (*Lobelia*) and one flower (*Clove*) being included. The final chapter is devoted to a description of the method of quantitative analysis of powders using *Lycopodium* spores and to miscellaneous structures likely to be seen in drugs or their powders.

In a short guide for practical work it is always difficult to decide what facts should be omitted. Necessarily the student must rely on the teacher or on textbooks for many details; all facts essential for a thorough appreciation of the practical side of the study should be included. Examined on this criterion the book under review appears in a favourable light. Modern quantitative methods are described, including the estimation of vein islet numbers and palisade ratios for leaves. It is surprising, however, that the several types of arrangement of the accessory cells of the stomata are not defined. Errata are commendably scarce; the misspelling of Burkill's name (p. 114) is evidently copied from the British Pharmacopoeia.

R. MELVILLE.

The Garden of Larkspurs.†—For many years the classification of cultivated *Delphiniums* has been in great confusion, so that this work by L. H. Bailey is very welcome.

It is a departure from most books on the subject, many of which only deal with *Delphiniums* as garden plants in the herbaceous border; this work, however, goes deeper into the question, making

* "The Microscopical Study of Drugs" by Lilian A. Kay. Baillière, Tindall & Cox, London, 1938. Pp. VIII+228. Price 10s. 6d.

† By L. H. Bailey. The Macmillan Co., New York, 1939. Pp. 116. Illustrated, Price 13s.

it equally valuable to the botanist, the horticulturist, and the hybridizer, while the help and advice given to the novice will be of great assistance.

Mention is made of more than one hundred species, including dwarf species from the high mountains of different parts of the northern hemisphere suitable for the rock garden, others from lower altitudes for the herbaceous border and for the wild garden, while the fancier's collection is also dealt with.

There is some reason for holding that the name *Delphinium Ajacis* should be applied to *D. orientale* J. Gay, which it undoubtedly covered, but as this view has not yet been fully substantiated, Dr. Bailey has retained *D. Ajacis* for the Rocket Larkspur, to which it has been generally applied for the last ninety years, in preference to adopting the name *D. Gayanum* Wilmott (*Journal of Botany*, 62, 26 : 1924).

On page 75 in the key, the difference is pointed out between two species in which there is some confusion in many botanic gardens, namely *Delphinium Requienii* and *D. Staphisagria*, the "Stavesacre" or the "Staphisagria of the herbalists," the seeds of which yield delphinine. Although there is considerable difference in the seeds of the two species, the plants when growing look very much alike. As it is pointed out, however, there is also a difference in the length of the spur, and it is not necessary to wait until the seeds have developed for correct determination.

Diseases (by L. H. Leonian, Editor for the Delphinium Society of America) and Pests (by W. E. Blauvelt, Professor in the College of Agriculture at Cornell University) are very fully dealt with, as also are soil, drainage, fertilising, mulching and position.

The key is very helpful, the pen drawings are exceptionally good, and the book is full of useful information, as is to be expected from an author of Dr. Bailey's wide knowledge and experience. It is a valuable addition to the series ushered in with "The Garden of Gourds" and "The Garden of Pinks."

G. H. PRESTON.